
SOLANA®
Serenity made simple®
Owner's Manual

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Serenity made simple®



Watkins Manufacturing Corporation

Owner's Manual

This Owner's Manual will acquaint you with your new spa's operation and general maintenance. We suggest that you take some time to carefully review all six sections. Please keep this manual available for reference.

If you have any questions about any aspect of your spa's set-up, operation or maintenance, contact your authorized Solana® dealer. They are trained professionals who are familiar with the product as well as new spa ownership concerns. Their expertise will facilitate the enjoyment of your new Solana spa.

The Serial Number/Identification label is located within the equipment compartment of your Solana spa. The serial number should also be documented on the delivery receipt from your dealer.

IMPORTANT: Watkins Manufacturing Corporation reserves the right to change specifications or design without notification and without incurring any obligation.

SOLANA

Purchase Information

DATE PURCHASED: ______________________________

DATE INSTALLED: ______________________________

DEALER: ______________________________

ADDRESS: ______________________________

TELEPHONE: ______________________________

SPA MODEL/SERIAL NUMBER: ______________________________

In most cities and counties, permits will be required for the installation of electrical circuits or the construction of exterior surfaces (decks and gazebos). In addition, some communities have adopted residential barrier codes which may require fencing and/or self-closing gates on the property to prevent unsupervised access to a pool (or spa) by children under 5 years of age. Your Solana® spa is equipped with a locking cover. As a general practice, your local Building Department will inform you of any applicable barrier requirements at the time a permit is obtained for the installation of an electrical circuit. Your Solana dealer can provide information on which permits may be required.

I. SAFETY INFORMATION

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW ALL INSTRUCTIONS

AVOIDING THE RISK TO CHILDREN

⚠ DANGER:

- **RISK OF CHILD DROWNING.** Extreme caution must be exercised to prevent unauthorized access by children. To avoid accidents, ensure that children cannot use a spa unless they are supervised at all times.

⚠ WARNING:

- To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- To reduce the risk of injury, lower water temperatures are recommended for young children. Children are especially sensitive to hot water.

DO:

- Make sure you always lock the child resistant locks after using the spa for your children's safety. Every Solana® spa is equipped with a locking cover.
- Test the water temperature with your hand before allowing your child to enter the spa to be sure that it's comfortable. Children are especially sensitive to hot water.
- Remind children that wet surfaces can be very slippery. Make sure that the children are careful when entering or exiting the spa.

DON'T:

- Allow children to climb onto the spa cover.
- Allow children to have unsupervised access to the spa.

Avoiding the Risk of Electrocution

⚠ *Danger: Risk of electrocution*

- Connect only to a grounded source.
- Do not bury the power cord. A buried power cord may result in death or serious personal injury due to electrocution if direct burial-type cable is not used, or if improper digging occurs.
- A ground terminal (pressure wire connector) is provided on the control box inside the unit to permit connection of a minimum No. 8 AWG (8.4 mm^2) solid copper bonding conductor between this point and any metal equipment, metal water pipe, metal enclosures of electrical equipment, or conduit within five feet (1.5 m) of the unit as needed to comply with local requirements.
- Do not operate the audio main controls while inside the spa (if spa is equipped with an audio component).
- Do not connect any auxiliary components (for example, cable additional speakers, headphones, additional audio components) to the audio system unless approved by Watkins Manufacturing Corporation .
- Do not self service audio component by opening or removing cover as this may expose dangerous voltage or other risk of injury. Refer all servicing to qualified service personnel.
- Do not attach an external antennae to a spa audio system unless installed by a licensed electrician in accordance with Article 810 of the National Electric Code, ANSI/NFPA 70.

⚠ Warning:

- To reduce the risk of electrical shock, replace a damaged cord immediately. Failure to do so may result in death or serious personal injury due to electrocution.
- Your spa is provided with a Ground Fault Circuit Interrupter for user and equipment protection. To ensure proper operation of this important safety device, test according to the following instructions per electrical configuration.

  Cord-Connected 115 Volt, 20 Amp Models: The GFCI is located at the end of the power cord. Before each use, with the unit operating, push the TEST button. The unit should stop operating. Push the RESET button. The spa should now return to normal operation. If the interrupter does not perform in this manner, there may be an electrical malfunction and with it, the possibility of an electric shock. Disconnect the power until the problem has been corrected.

  Hard-Wired 115 Volt, 30 Amp Models: The GFCI breaker, located inside the sub-panel, supplies all of the power to the spa. Before each use, open the sub-panel and press the TEST button located on the sub-panel GFCI breaker. The breaker should

snap into the "tripped" position and the spa should stop operating. Reset the sub-panel GFCI breaker by completely flipping the breaker switch down, into the off position. Then, flip the breaker switch up, into the on position. Power should be restored and the spa should resume operation. If the breaker does not perform in this manner, there may be an electrical malfunction and with it, the possibility of an electric shock. Disconnect the power until the problem has been corrected.

⚠ *DANGER: RISK OF ELECTRIC SHOCK*

- Install at least 5 feet (1.5 m) from all metal surfaces. A spa may be installed within 5 feet of a metal surface if each metal surface is permanently connected by a minimum No. 8 AWG (8.42 mm^2) solid copper conductor attached to the wire ground connector on the terminal box that is provided for this purpose if in accordance with National Electrical Code ANSI/NMFPA70-1993.
- Do not permit any electrical appliances, such as a light, telephone, radio, or television within 5 feet (1.5 m) of a spa. Failure to maintain a safe distance may result in death, or serious personal injury due to electrocution, if the appliance should fall into the spa.
- Install your spa is such a way that drainage is away from the electrical compartment and from all electrical components.

DO:

- Be sure your spa is connected to the power supply correctly - use a licensed contractor.
- Disconnect the spa from the power supply before draining the spa or servicing the electrical components.
- Test the Ground Fault Circuit Interrupter(s) before each use.

DON'T:

- Use the spa with the equipment compartment door removed.
- Place electrical appliances within 5 feet (1.5m) of the spa.
- Use an extension cord to connect the spa to its power source. The cord may not be properly grounded and the connection is a shock hazard. An extension cord may cause a voltage drop, which will cause overheating of the jet pump motor and motor damage.
- Attempt to open the electrical control box. There are no user serviceable parts inside.

Risks to Avoid

⚠ *Danger: Risk of Injury*

- To reduce the risk of injury to persons, DO NOT remove suction fittings (filter standpipes) located in the filter compartment.
- The suction fittings in the spa are sized to match the specific water flow created by the pump. Should the need arise to replace the suction fittings or the pump, be sure that the flow rates are compatible.
- There is a danger of slipping and falling. Remember that wet surfaces can be very slippery. Take care when entering or exiting the spa.
- People with infectious diseases should not use the spa.
- Keep any loose articles of clothing, long hair or hanging jewelry away from rotating jets or other moving components.

Increased side effects of medication

- The use of drugs, alcohol or medication before or during spa use may lead to unconsciousness with the possibility of drowning.
- Persons using medications should consult a physician before using a spa; some medication may cause a user to become drowsy, while other medication may affect heart rate, blood pressure and circulation.
- Persons taking medications which induce drowsiness, such as tranquilizers, antihistimines or anticoagulents should not use the spa.

Health problems affected by spa use

- Pregnant women should consult a physician before using spa.
- Persons suffering from obesity or with a medical history of heart disease, low or high blood pressure, circulatory system problems or diabetes should consult a physician before using spa.

Unclean water

- Keep the water clean and sanitized with correct chemical care. The recommended levels for your Solana® spa are:

- Free Available Chlorine (FAC):	3.0-5.0 ppm	- Total Alkalinity:	40-125 ppm
- Water pH:	7.4-7.6	- Calcium Hardness:	50-150 ppm

(Refer to Water Quality and Maintenance section for complete instructions.)

IMPORTANT: Turn on the jet pump for a least ten minutes after adding ANY spa water chemicals into the filter compartment.

- Clean the filter cartridge monthly to remove debris and mineral buildup which may affect the performance of the hydromassage jets, limit the flow, or trip the high limit thermostat which will turn off the entire spa.

Avoiding the Risk of Hyperthermia

Prolonged immersion in hot water can result in HYPERTHERMIA, a dangerous condition which occurs when the internal temperature of the body reaches a level above normal 98.6°F (37°C). The symptoms of hyperthermia include unawareness of impending hazard, failure to perceive heat, failure to recognize the need to exit the spa, physical inability to exit the spa, fetal damage in pregnant women, and unconsciousness resulting in a danger of drowning.

⚠ WARNING:

The use of alcohol, drugs, or medication can greatly increase the risk of fatal hyperthermia in hot tubs and spas.

To Reduce the Risk of Injury:

- The water in the spa should never exceed 104°F (40°C). Water temperatures between 100°F (38°C) and 104°F (40°C) are considered safe for a healthy adult. Lower water temperatures are recommended for extended use (exceeding 10 minutes) and for young children. Extended use can cause hyperthermia.
- Pregnant or possibly pregnant women should limit spa water temperatures to 100°F (38°C). Failure to do so may result in permanent injury to your baby.
- Do not use spa immediately following strenuous exercise.

Avoiding the Risk of Skin Burns:

- To reduce the risk of injury, before entering a spa the user should measure the water temperature with an accurate thermometer.
- Test the water with your hand before entering the spa to be sure it's comfortable.

Safety Sign

Each Solana® spa is shipped with a SAFETY SIGN in the owner's package. The sign, which is required as a condition of Product Listing, should be permanently installed where it is visible to the users of the spa. To obtain additional SAFETY SIGNS, contact your Solana Spa Dealer and request Part #70798.

IMPORTANT SPA INFORMATION

IMPORTANT: In areas where the ambient temperature falls below 20°F, and you do not want to winterize your spa, it is recommended that you convert the Solana to a 115V, 30 amp configuration. In this configuration, the heater will remain on while the jet pump is activated.

Proper ventilation and sanitation of the spa is necessary in order to control the bacteria and viruses present in the water or introduced during use of the spa. Read and follow the WATER QUALITY AND MAINTENANCE PROCEDURES thoroughly!

The following contains important spa information, and we strongly encourage you to read and apply it.

DO:

- Use and lock the cover when the spa is not in use, whether it is empty or full.
- Follow the Spa Care and Maintenance recommendations stated in this manual.
- Use only approved accessories and recommended spa chemicals and cleaners.

DON'T:

- Leave the Solana® spa exposed to the sun without water or the cover in place. Exposure to direct sunlight can cause solar distress of the shell material.
- Roll or slide the spa on its side. This will damage the siding.
- Lift or drag the cover by using the tie-down straps; always lift or carry the cover by using the handles.
- Attempt to open the electrical control box. There are no user serviceable parts inside. Opening of the control box by the spa owner will void the warranty. If you have an operational problem, carefully go through the steps outlined in the Troubleshooting section. If you are not able to resolve the problem, contact your authorized Solana Spa Dealer. Many problems can easily be diagnosed over the telephone by an Authorized Service Technician.

SAVE THESE INSTRUCTIONS

II. INSTALLATION INSTRUCTIONS

SITE PREPARATION

You probably have a spot picked out for your new spa, whether it's indoors or outdoors, on a patio or on a deck. Just make sure you check the following:

- Always put your spa on a structurally sound, level surface. A filled spa can weigh a great deal. Make certain that the location you choose can support the weight of your filled spa.
- It is highly recommended that a carpet remnant, carpet pad or rubber mat be cut to the footprint of the spa, and that the spa be placed directly on it. This minimizes noise associated with spa operation.
- Don't forget to level your spa before filling it. (See the Spa Leveling section of this manual)
- Locate the front access panel, which houses all of the electrical components, in a place where water will drain away from it. Allowing water into the electrical equipment area can damage the electronics, or may result in tripping your house's circuit breaker.
- Leave yourself easy access to the Ground Fault Circuit Interrupter (GFCI) for testing. The GFCI is located at the end of the power cord, or at the sub-panel of a hard-wired (optional) 30 amp spa.
- Never let water get into the sub-panel (optional 30 amp models) or into the electrical outlet that your spa is plugged into. Your spa's sub-panel is raintight when installed correctly with the door closed. Consult your local code authority to determine if an electrical outlet with a cover is required for your installation. If it is, a suitable outlet may be purchased from your Authorized Solana® Dealer. Ask for Part #71591.
- Leave access to the front access panel for periodic spa care and maintenance.
- Leave access to the drain located on the left side of the spa.
- If your spa is going to be installed in a location known to be frequented by mice, rats or other nocturnal creatures, Watkins Manufacturing Corporation recommends covering the access opening to the spa's equipment compartment with a heavy gauge screen material available at your local hardware store.

⚠ WARNING: Damage to the spa's equipment compartment components or internal plumbing as a result of rodent infestation is NOT covered under your warranty!

INDOOR/BASEMENT INSTALLATION

Be aware of some special requirements if you place your spa indoors. Water will accumulate around the spa, so flooring materials must provide a good grip when wet. Proper drainage is essential to prevent a build-up of water around the spa. When building a new room for the spa it is recommended that a floor drain be installed. The humidity will naturally increase with the spa installed. Water may get into woodwork and produce dryrot, mildew, or other problems. Check for airborne moisture's effects on exposed wood, paper, etc. in the room. To minimize these effects, it is best to provide plenty of ventilation to the spa area. An architect can help to determine if more ventilation must be installed. Proper ventilation and sanitation are necessary in order to control the bacteria and viruses present in the water or introduced during use of the spa.

Your Solana® Spa Dealer can help you with local information such as zoning regulations and building codes.

CAUTION: Do not install the spa on a heated floor surface. This will damage the bottom of the spa.

⚠ **WARNING: Please keep the area around your spa well ventilated when it is installed indoors or in a confined area.** Inadequate ventilation around the spa could cause a build-up of a higher-than-normal concentration of spa chemicals and/or bacterial fragments. These dispersed spa chemicals and/or bacterial fragments can be inhaled, and may result in breathing difficulties or lung damage in certain people suffering from a compromised immune system or respiratory infection. If you or other bathers are affected by this condition, please seek medical attention as soon as possible.

In addition to the above, properly clean and maintain your spa as follows:

- Follow all procedures in this owner's manual and printed instructions on all water care (chemical) products packaging.
- Test the water regularly to ensure proper levels of sanitizers, pH, and other water care requirements.
- Drain, clean, and refill your spa with fresh water on a regular schedule, and in accordance with this owner's manual.
- Clean the filter(s) at least once per month.
- Check to make sure you have proper circulation throughout your spa water system.
- Have spa users bathe before entering the spa water.

⚠ WARNING

Lowering the top of the spa to deck level, substantially increases the potential of accidental entry. Contact your *Solana* Dealer for more information and consult a licensed building contractor to design or evaluate your custom decking requirements.

DECK INSTALLATION

To be certain your deck can support your spa, you must know the deck's maximum load capacity. Consult a qualified building contractor or structural engineer. To find the weight of your spa, its contents and occupants, refer to the Spa Specifications. This weight per square foot must not exceed the structure's rated capacity, or serious structural damage could result.

OUTDOOR INSTALLATION

No matter where you install your new spa, it's important that you have a solid foundation to support it. Structural damage to the spa resulting from incorrect installation or placement on an inadequate foundation is not covered under the spa's limited warranty.

If you install the spa outdoors, we recommend a reinforced concrete pad at least four inches thick. The reinforcing rod or mesh in the pad should be attached to a bond wire.

If you place the spa on the ground, even temporarily, place stepping stones under the leveling areas (see Spa Leveling Instructions). The stones should be at least two inches thick and twelve inches square. Even with stones in place, the spa will inevitably settle and become unlevel. Plus, a spa surrounded by dirt or grass will soon be filled with dirt or grass from users' feet; therefore, it is important to get it onto a solid foundation as soon as possible.

HOW TO MOVE THE SOLANA SPA

The Solana spa has been designed to be easy to move and install. For ease of handling, the spa should be moved as close as possible to the installation site before unpackaging. **NOTE:** Take care not to damage the spa with unpacking tools.

NOTE: Before unpacking or moving the spa, verify that you have a clear pathway to its destination (measure if necessary).

CAUTION: Do not slide or roll the spa on its side. This will damage the siding.

REMOVAL AND REPLACEMENT OF THE FRONT ACCESS PANEL (TX SPA)

Your TX spa uses three panels that are attached to the frame. These panels are referred to as side panels and a front panel. The front panel is located below the control panel. Behind the front panel, you'll find all the electrical components. The front panel is held onto the frame with six Phillips screws.

REMOVAL OF THE FRONT ACCESS PANEL

- **Remove the six screw caps -** Place a flat head screwdriver between the panel and the screw cap, then carefully rotate the screwdriver to remove the screw cap.
- **Remove the six Phillips screws** - Starting with the upper right corner of the front panel followed by the two below, then repeat on the left side.
- **Remove the front access panel -** The top of the front panel is tucked behind the lip of the spa shell. Push down on the upper right corner of the front panel (this will create a bow in the front panel) slide other hand behind the front access panel and pull front panel away from the spa.

Replacement of the front access panel

- **Replace the front access panel -** Position the left side of the front panel at a 45° angle tucking the upper left corner of the panel under the spa shell while aligning the end of the panel with the scribe line. Lower panel, then continue tucking the top of the front panel under the shell moving from left to right until the entire top of the front panel is tucked under the shell.
- **Replace the six Phillips screws -** Align the top left hole of the front access panel with the hole behind the panel, insert a Phillips screw and rotate twice. Align the right top hole and insert a Phillips screw and rotate twice. Insert the other four Phillips screws into the remaining holes, then tighten all six screws.
- **Replace the six screw caps -** Replace the screw caps by pushing the caps onto the screws using your thumb.

REMOVAL AND REPLACEMENT OF THE FRONT ACCESS PANEL (SX SPA)

Your SX spa uses 4 screws to hold the front door panel onto the spa.

- **Remove the front door panel -** To remove the front door panel, loosen and remove the 4 screws holding the door panel onto the spa, then remove door panel from spa.
- **Replace the front door panel -** To replace the front door panel, place door panel against frame of spa, line up holes and attach door panel to spa using 4 screws.

Installation Notes:

1. If you are an owner of a condominium, town home/patio home or are a member of a homeowner's association, contact your representatives regarding their requirements. If you have any questions regarding zoning requirements or building codes, contact

your local city government office.

2. **IMPORTANT:** The spa is designed for installation on a relatively flat and level surface. Installing the spa on an unlevel surface will result in unlevel water and an aesthetically unbalanced spa, and may affect its performance. The spa may be shimmed according to the following Spa Leveling Instructions; however, shimming of the spa may place additional stress on the spa's support system. Damage to the spa caused by the incorrect installation of the spa is not covered by the warranty.

3. Place spa in the desired location and determine which one of the two exits will be used for your power cord (See illustration). A notch on the bottom of one of the side panels must be selected as the exit location. Remove the front access panel to expose the equipment, frame, plumbing and foam insulation. Unwind the power cord, located inside the equipment compartment. Work the cord into the notch of the frame below the equipment compartment. Pull the cord following the contour of the spa in the direction of the exit notch. Once you reach the side panel, remove the bottom screw in the side panel, then tuck the cord behind the side panel until you reach the exit notch where the cord should be seated. **Do <u>not</u> plug the spa in until the spa is filled with water!** Replace side panel screw once cord is installed.

SPA LEVELING INSTRUCTIONS

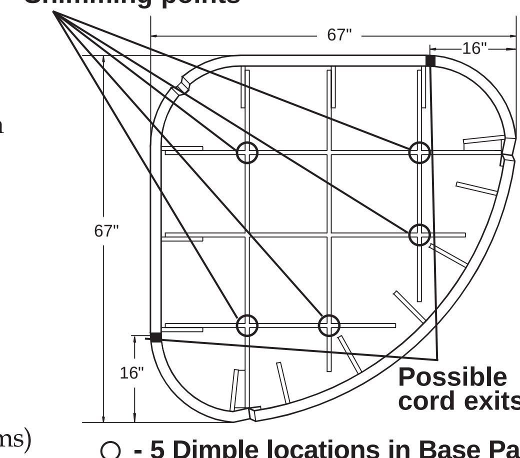
Approved Shim Material 1/4" to 1/2" (0.5 cm to 1.5 cm) thick, cut into 2" x 4" (5 cm x 10 cm rectangles):

- Cedar Shingles
- Exterior Rated Plywood
- Redwood
- Exterior Rated Lumber

SUGGESTED LEVELING PROCEDURE:

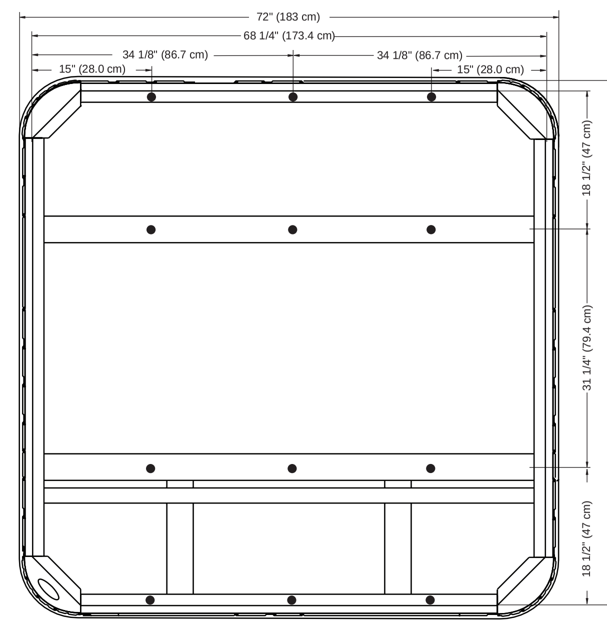
1. Using a six-foot carpenter's level (or a short level and a straight piece of wood about eight feet long), check the spa to identify the lowest and highest corners.
2. With one end of the carpenter's level resting on the highest corner of the spa, and the opposite end resting on the lowest corner, gently raise the lower end of the level with shims placed on the corner of the spa shell, until a level reading is achieved.
3. Carefully lift and pivot the carpenter's level (so as not to knock over your stack of shims) to the remaining corner. The TX spa may be shimmed under any of the dimple locations shown in the bottom view of the spa. The SX spas may be shimmed under any of the leveling points (•) found on the next page. Place the required number of shims under the end of the level at each corner and along

TX Spa



the rounded side, until a level reading is achieved. These are now your preselected shims.

4. Carefully remove the carpenter's level and the sets of shims. With one or more persons lifting the lowest side of the spa, place a 4″ x 4″ (10-cm x 10 cm) block under the spa base, in the center of the side lifted.
5. Set the preselected shim sets under the wooden base support at each shimming point, as shown. Lift the spa, remove the support block, and set the spa on the shims. Repeat this procedure for the opposite side of the spa, if necessary.
6. Use the carpenter's level to recheck the level of the spa.
7. Identify the locations of any remaining shimming points using the illustration below, and carefully slide helper shims under the spa beneath each location. These helper shims should create a snug fit between the foundation and base support system. If it is necessary to lift the spa to place the helper shims, use care not to kick out the original corner shims.



SX Spa

• **12 Leveling Points**

ELECTRICAL REQUIREMENTS AND PRECAUTIONS

General Information

IMPORTANT: On Canadian spas, CSA requirements for Canadian spas do not allow the spa to be cord connected.

Your Solana® spa has been carefully designed to give you maximum safety against electrical shock. Connecting the spa to an improperly wired circuit will negate many of the spa's safety features. Please read and follow the electrical installation requirements and instructions for your specific spa model completely!

There are two electrical configurations associated with Solana spas. Each spa comes standard as a 115 volt, 15-amp or 20 amp (SX), cord-connected electrical configuration, which is designated as an "either/or" hydromassage system. This means that the heater will not activate simultaneously with the high speed mode of the jet pump. If you use your spa for extremely long periods of time with the high speed jet pump operating, you may experience a slight drop in water temperature. This happens because the heater will not heat while the pump is running on high. To allow the heater to operate at the same time as the high speed jet pump, the spa may be converted (by an authorized technician) to a 115 volt, 30 amp hard-wired configuration. The 30 amp configuration provides enough electrical current to allow the heater and the high speed jet pump to operate simultaneously. Conversion requires electrical modification within the control box (contact an authorized Solana Service Technician) and the installation of an electrical subpanel (available from your Solana dealer). A licensed electrician must install the subpanel.

Electrical Requirements

The spa must be connected to a 115 volt, 15 or 20 amp (30 amp for converted models) grounded circuit. The equipment pack requires a MINIMUM of 104 volts under load. A dedicated circuit is required; the term "dedicated" means the electrical circuit is not being used for any other high-load electrical items (patio lights, appliances, garage circuits, etc.). If the spa is connected to a non-dedicated circuit, overloading will result in "nuisance tripping" of the internal fuses or of the breaker switch at the house electrical breaker panel.

The circuit must be properly wired; that is, it must have the following:

- **Standard (cord-connected) 115, volt 15 amp –** A minimum 15 amp circuit breaker (a GFCI breaker is recommended) in the house breaker panel, #14-AWG or larger wire (including the ground wire) and the correct polarity throughout the circuit.
- **Standard (cord-connected) 115, volt 20 amp (SX Spa)** - A minimum 20 amp GFCI circuit breaker in the house panel, #12-AWG or larger wire (including the ground wire) and the correct polarity throughout the circuit.

- **Converted (hard-wired) 115 volt, 30 amp –** A minimum 30 amp circuit breaker in the house breaker panel, #10-AWG or larger wire (including the ground wire), a sub-panel with an appropriate GFCI breaker, and the correct polarity throughout the circuit.

A pressure wire connector is provided on the exterior surface of the spa's electrical control box, located inside the equipment compartment. This is to permit the connection of a bonding ground wire between this point and any metal equipment, enclosures, pipe or conduit within five feet of the spa (if needed to comply with local building code requirements). The bonding wire must be at least a #8 AWG solid copper wire.

NEVER CONNECT THE SPA TO AN EXTENSION CORD!

Spa Installation Instructions

Each Solana® spa comes equipped with approximately 15 feet of usable power cord (this is the maximum length allowed by regulatory standards and the National Electric Code). The power cord is stored for shipping inside the equipment compartment. To remove the power cord, see Installation Notes, note #3, on page 10.

If you choose to convert your spa to 115 volt, 30 amp operation (contact an authorized Solana Spa Service Technician to perform the conversion), a licensed electrician must install the sub-panel (available from your Solana dealer). Refer to the 30 amp wiring instructions at the end of this section for electrical connections and specifications.

Standard, Cord-Connected 115 volt, 15 or 20 amp Configuration

For your safety, if you are having an electrician install an electric outlet for the spa, it should be no closer than five (5) feet (1.5 m) and no further than ten (10) feet (3 m) from the spa. [Reference National Electrical Code 680 - 6a(1) and 680 - 41a.]

One GFCI is used in the cord-connected 15 or 20 amp configuration. The GFCI module is located at the end of the power cord. To test the GFCI, simply press the TEST button. The GFCI should trip to the "off" position, disconnecting power to the spa. To reset the GFCI, press the RESET button. The GFCI should reset, and power should be restored to the spa. If the GFCI does not function in this way, unplug the cord and contact an authorized Solana Spa Service Technician.

NOTE: Consult your local code authority to determine if an electrical outlet with a cover is required for your installation. If it is, a suitable outlet cover may be purchased from your Authorized Solana Dealer. Ask for Part #71591.

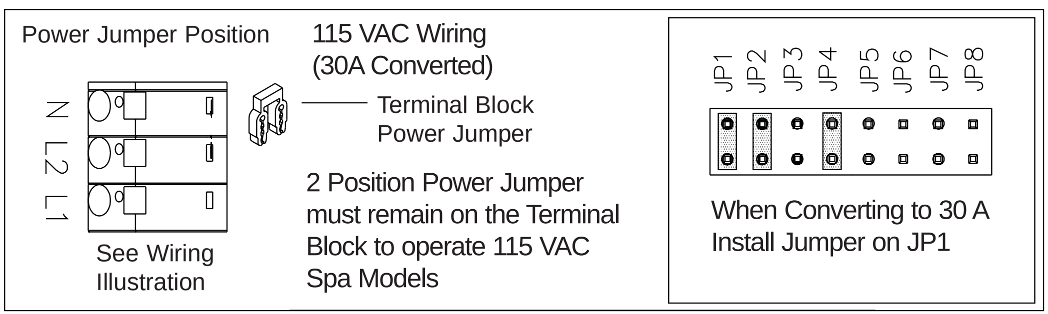
Converted 115 Volt, 30 Amp Configuration

Conversion Instructions

NOTE: An Authorized Solana® Spa Technician must perform the conversion.

1. Disconnect power to the spa and access the control box.
2. Locate the program jumpers (JP1 - JP8) at the top right of the control box.
3. Using a pair of needle nose pliers, carefully remove the parked (spare) jumper.
4. Attach parked jumper to JP1 as illustrated below.

A licensed electrician must install the sub-panel (available from your Solana Spa Dealer) to supply power to the spa. The sub-panel must be placed in sight of the spa, at a minimum distance of 5 feet (1.5 m) away.

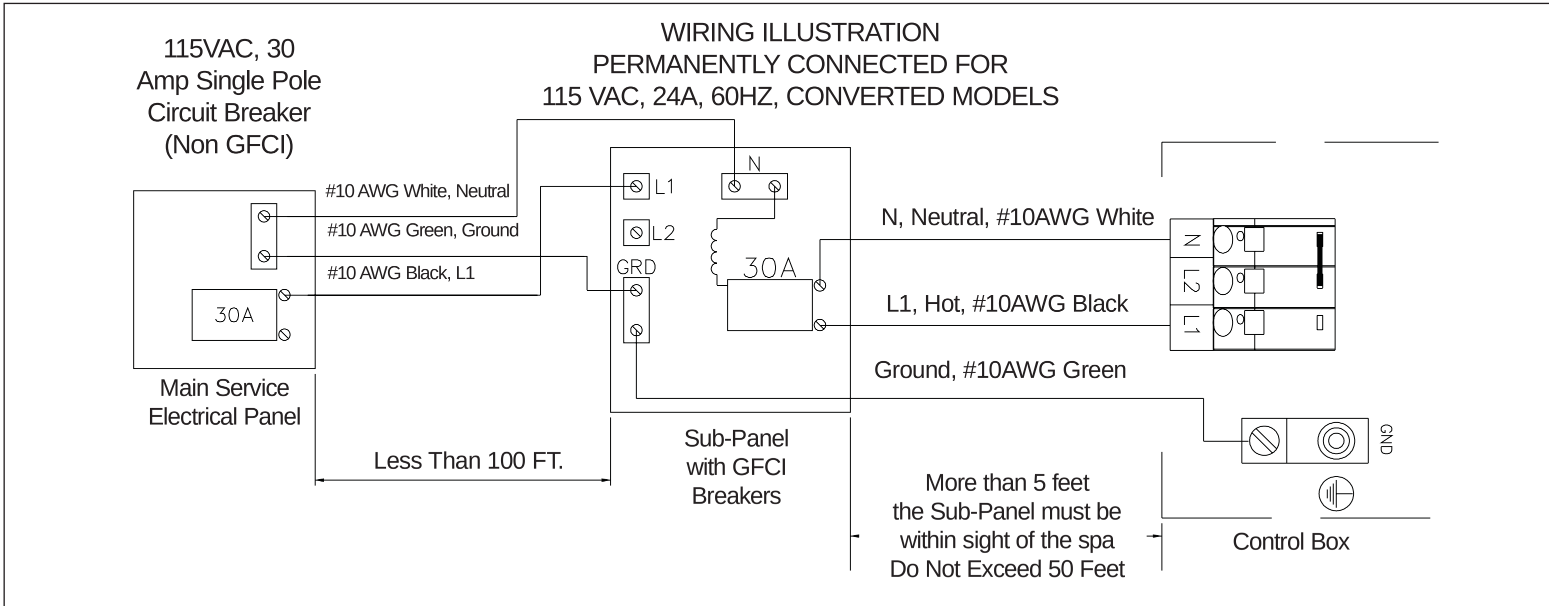


NOTE:
- Jumpers are located in top right corner of Control Box labeled P4 “Config Jumpers”
- To Change from fahrenheit to celsius remove jumper on JP2.

30 AMP SUB-PANEL WIRING INSTRUCTIONS

NOTE: The sub-panel must be placed within 100 feet of the main electrical service panel, and between 5 and 50 feet (1.5 and 15 meters) away from the spa. Refer to the wiring diagram below.

1. Connect the #10 AWG, WHITE [NEUTRAL] wire from the main electrical service panel to the sub-panel NEUTRAL bar.
2. Connect the #10 AWG, GREEN [GROUND] wire from the main electrical service panel to the sub-panel GROUND bar.
3. Connect the #10 AWG, BLACK [L1] wire from the main electrical service panel to the sub-panel [terminal L1].
4. Check the connections internal to the sub-panel and be sure that a pigtail wire exists between the neutral bar and the 30 amp breaker. NEVER remove the pigtail wires!



5. Inside the control panel, locate the terminal block (TB-1).
6. Remove existing power cord.
7. Connect the #10 AWG, BLACK wire from the sub-panel 30 amp GFCI breaker [terminal L1] to TB-1 terminal L1.
8. Connect the #10 AWG, WHITE wire from the sub-panel 30 amp GFCI breaker [terminal N, load neutral] to TB-1 terminal N.
9. Connect the #10 AWG, GREEN wire from the sub-panel GROUND bar to TB-1 terminal GROUND.

The GFCI breaker inside the sub-panel supplies all of the power to the spa. Before each use, open the sub-panel and press the TEST button located on the sub-panel GFCI breaker. The breaker should snap into the "tripped" position and the spa should stop operating. Reset the sub-panel GFCI breaker by completely pressing the breaker switch down, into the OFF position. Then, flip the breaker switch up, into the ON position. Power should be restored and the spa should resume operation.

If the GFCI breaker fails to operate in this manner, it is an indication of an electrical malfunction and the possibility of an electric shock. Disconnect the power until the fault has been identified and corrected.

IMPORTANT: Should you ever find the need to move or relocate your Solana® spa, it is essential that you understand and apply these installation requirements. Your Solana spa has been carefully engineered to provide maximum safety against electric shock. Remember, connecting the spa to an improperly wired circuit will negate many of its safety features.

Converted 230 Volt, 50 Amp Configuration

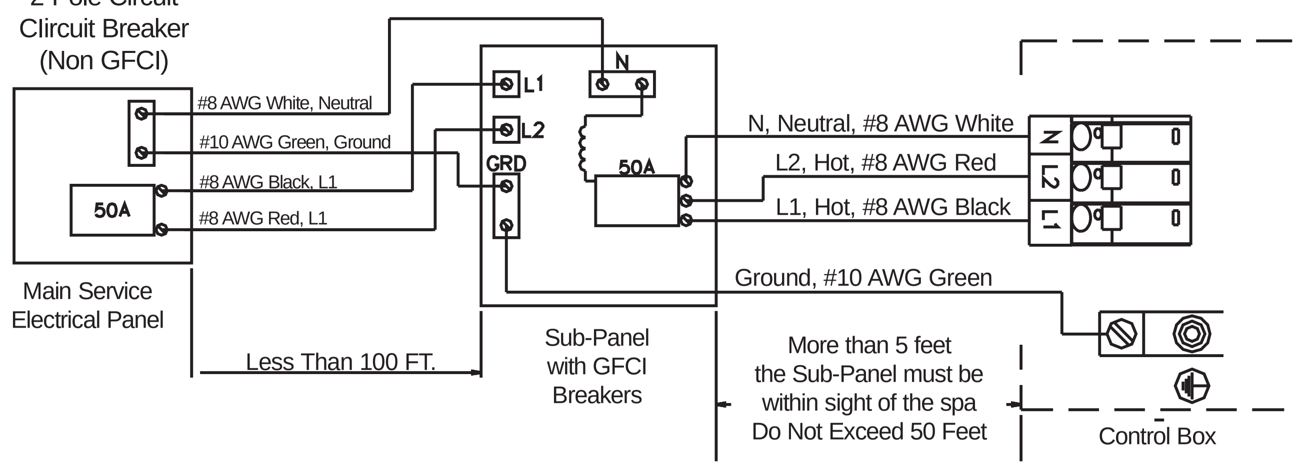
Conversion instructions

NOTE: An Authorized Solana® Spa Technician must perform the conversion.

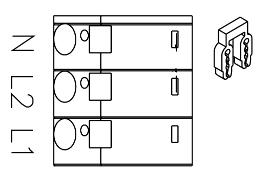
1. Disconnect power to the spa and access the control box.
2. Locate the program jumpers (JP1 - JP8) at the top right of the control box.
3. Using a pair of needle nose pliers, carefully remove the parked (spare) jumper.
4. Attach parked jumper to JP1 as on next page.

A licensed electrician must install the sub-panel (available from your Solana Spa Dealer) to supply power to the spa. The sub-panel must be placed in sight of the spa, at a minimum distance of 5 feet (1.5 m) away.

WIRING ILLUSTRATION
OPTIONAL 50A/230V SUBPANEL CONVERSION CONNECTION
230 VAC, 40A, 60HZ, CONVERTED MODELS



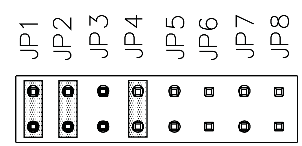
Power Jumper Position



See Wiring Illustration

230 VAC Wiring (50A Converted)

2 Position Power Jumper must be removed on the Terminal Block to operate 230 VAC Spa Models



When Converting to 50 A Install Jumper on JP1

NOTE:
- Jumpers are located in top right corner of Control Box labeled P4 “Config Jumpers”
- To Change from fahrenheit to celsius remove jumper on JP2.
- Verify Red Internal Power Jumper is connected at P40 (B) to P24 (B).

50 AMP (OPTIONAL) SUB-PANEL WIRING INSTRUCTIONS

NOTE: The sub-panel must be placed within 100 feet of the main electrical service panel, and between 5 and 50 feet (1.5 and 15 meters) away from the spa. Refer to the wiring diagram above.

1. Connect the #8 AWG, WHITE [NEUTRAL] wire from the main electrical service panel to the sub-panel NEUTRAL bar.
2. Connect the #10 AWG, GREEN [GROUND] wire from the main electrical service panel to the sub-panel GROUND bar.
3. Connect the #8 AWG, BLACK [L1] wire from the main electrical service panel to the sub-panel [terminal L1].
4. Connect the #8 AWG, RED [L2] wire from the main electrical service panel to the sub-panel [terminal L2].
5. Check the connections internal to the sub-panel and be sure that a pigtail wire exists between the neutral bar and the 50 amp breaker. NEVER remove the pigtail wires!
6. Inside the control panel, locate the terminal block (TB-1).
7. Remove existing power cord.
8. Connect the #8 AWG, BLACK wire from the sub-panel 50 amp GFCI breaker [terminal L1] to TB-1 terminal L1.
9. Connect the #8 AWG, RED wire from the sub-panel 50 amp GFCI breaker [terminal L2] to TB-1 terminal L2.
10. Connect the #8 AWG, WHITE wire from the sub-panel 50 amp GFCI breaker [terminal N, load neutral] to TB-1 terminal N.
11. Connect the #10 AWG, GREEN wire from the sub-panel GROUND bar to TB-1 terminal GROUND.

The GFCI breaker inside the sub-panel supplies all of the power to the spa. Before each use, open the sub-panel and press the TEST button located on the sub-panel GFCI breaker. The breaker should snap into the “tripped” position and the spa should stop operating. Reset the sub-panel GFCI breaker by completely pressing the breaker switch down, into the OFF position. Then, flip the breaker switch up, into the ON position. Power should be restored and the spa should resume operation.

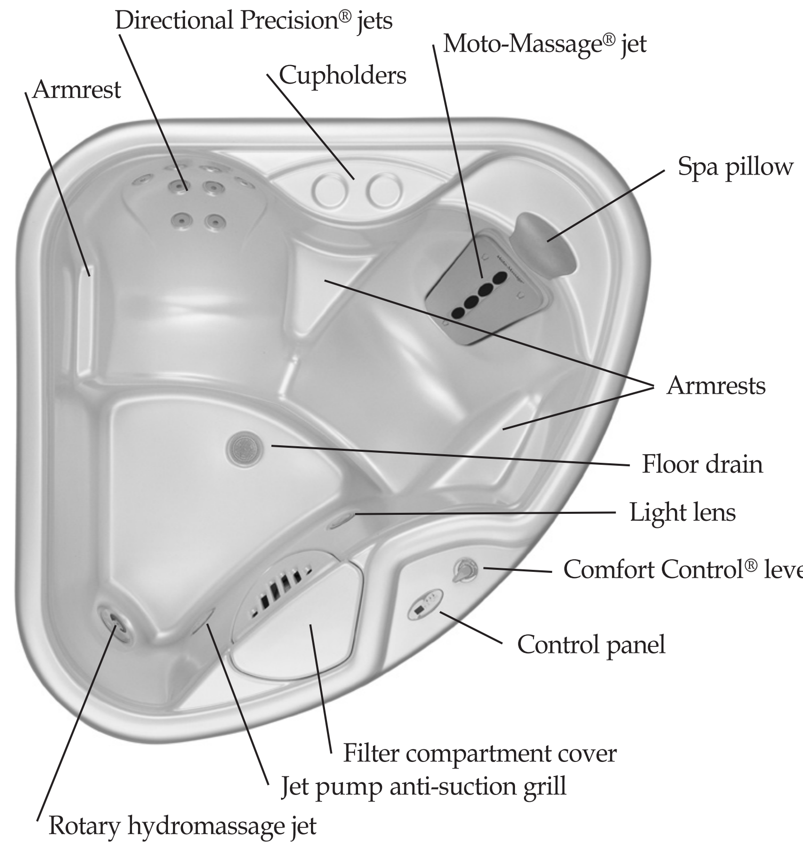
If the GFCI breaker fails to operate in this manner, it is an indication of an electrical malfunction and the possibility of an electric shock. Disconnect the power until the fault has been identified and corrected.

IMPORTANT: Should you ever find the need to move or relocate your Solana® spa, it is essential that you understand and apply these installation requirements. Your Solana spa has been carefully engineered to provide maximum safety against electric shock. Remember, connecting the spa to an improperly wired circuit will negate many of its safety features.

TX SPA SPECIFICATIONS

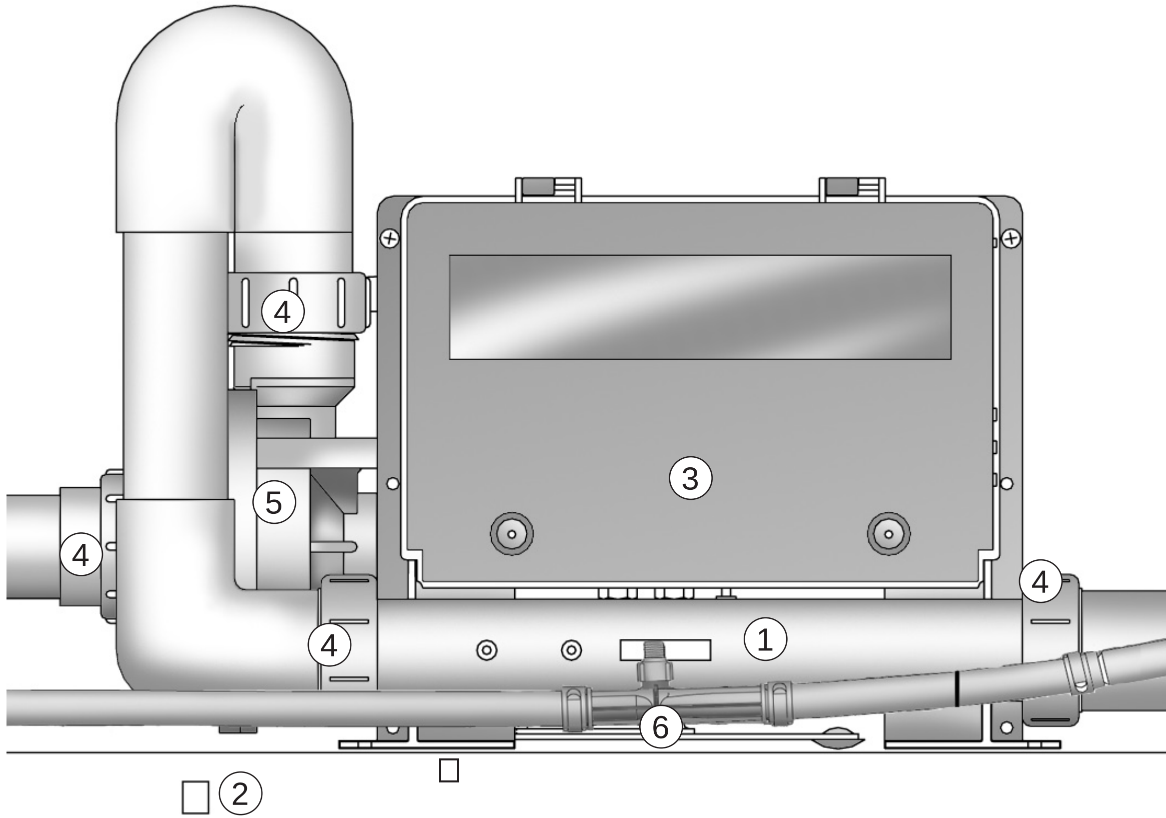
HORIZONTAL DIMENSIONS:	67″ x 67″ (170 cm x 170 cm)
HEIGHT (without cover):	29″ (74 cm)
EFFECTIVE FILTER AREA:	30 sq. ft. (2.7 sq. meters)
HEATER:	1000 watts (1.0 kW)
WATER (capacity):	130 gallons (492 liters)
WEIGHT:	324 lbs. dry (147kg), 1,714 lbs. filled (777 kg) (Includes weight of water and 2 adults @ 175 lbs. ea.)
DEAD WEIGHT (filled):	60 lbs. per sq. ft., 285 kg per sq. meter
ELECTRICAL REQUIREMENTS:	115 volt, 15 amp grounded circuit (standard) 115 volt, 30 amp grounded circuit (optional) - requires 30 amp sub-panel
NOTE:	30 amp wiring must be performed by a licensed electrician.
CERTIFICATIONS:	ETL Listed, CE Listed

Overhead View



TX EQUIPMENT COMPARTMENT VIEW

1. 1.0 kW Heater
2. Spa Drain Valve
3. Electrical Control Box
4. Compression Unions
5. Jet Pump
   (Wavemaster® 4000)
6. Ozone Injector
   (FreshWater® III
   Ozone is Optional)



SX SPA SPECIFICATIONS

HORIZONTAL DIMENSIONS: . . . 72″ (183 cm.) square

HEIGHT (without cover):. . . . . 33″ (83.8 cm)

EFFECTIVE FILTER AREA: . . . . . . 30 sq. ft. (2.79 sq. meters)

HEATER: . . . . 1000 watts (1.0 kW)

WATER (capacity): . . . . 285 gallons (1078 liters)

WEIGHT:. . . . . 525 lbs. dry (238 kg), 3,675 lbs. filled (1667 kg) (Includes weight of water and 3 adults @ 175 lbs. ea.)

DEAD WEIGHT (filled):. . . . . 105 lbs. per sq. ft., 510 kg per sq. meter

ELECTRICAL REQUIREMENTS: 115 volt, 20 amp grounded circuit (standard)
115 volt, 30 amp grounded circuit (optional) - requires 30 amp sub-panel

NOTE:. . . . . 30 amp wiring must be performed by a licensed electrician.

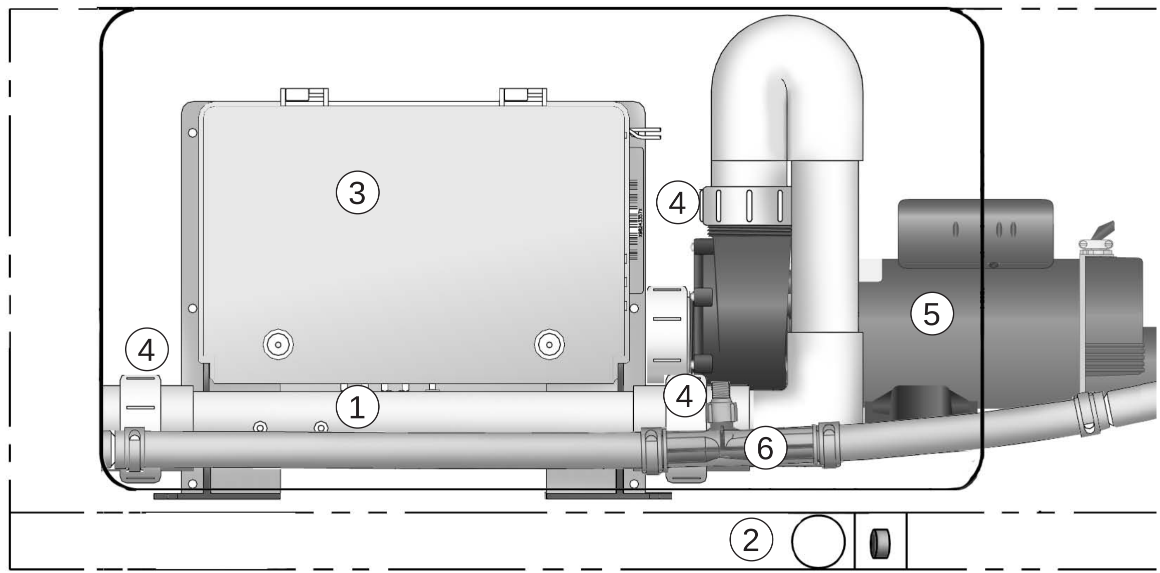
CERTIFICATIONS: . . . . ETL Listed, CE Listed

OVERHEAD VIEW



SX EQUIPMENT COMPARTMENT VIEW

1. 1.0 kW Heater
2. Spa Drain Valve
3. Electrical Control Box
4. Compression Unions
5. Jet Pump (Wavemaster® 6000)
6. Ozone Injector (FreshWater® III Ozone is Optional)



III. OPERATING INSTRUCTIONS

START-UP AND REFILL PROCEDURES

Your Solana® spa has been thoroughly tested during the manufacturing process to ensure reliability and long-term customer satisfaction. A small amount of water may have remained in the plumbing after testing and, as a result, may have spotted the spa shell or the spa siding prior to delivery. Before filling the spa, wipe the spa shell clean with a soft rag.

The following instructions must be read and followed exactly to ensure a successful start-up or refill.

CAUTIONS

- **Do not fill the spa with hot water, as tripping of the high-limit thermostat may result.**
- **Do not connect power to an empty spa. Power to the spa automatically activates critical components within the spa, such as Controls, the Heater and other systems. If power is supplied to these components prior to the spa being filled, the components will be damaged, and this may result in a non-warranty component failure.**
- **Do not use your spa after filling until all of the steps listed below are completed.**
- **Do not add chlorine if treating your spa with polyhexamethylene biguanide (Biguanide, PHMB, eg. BaquaSpa®) sanitizer.**

1. Close the drain, attach the drain cap and fill the spa with water through the filter compartment. The water level of the TX Solana spa should be maintained at seven (7) inches (18 cm) below the bar top (top of the spa), or even with the top of the filter. The water level of the SX spa should be maintained at six (6) inches (15 cm) below the bar top.

   RECOMMENDED: Use the Clean Screen™ pre-filter to remove unwanted contaminants from the tap water.

   IMPORTANT: Watkins Manufacturing Corporation does not recommend that the spa be filled with "softened" water, as this may damage the spa's equipment.

2. **AFTER** the spa has been filled with water and the equipment compartment door is secured, power must be applied to the spa.

- Cord connected 115 Volt, 20 amp Model – Connect the plug to the dedicated outlet and push the Reset button on the GFCI.
- Converted 115 Volt, 30 amp Models – Open the door of the electrical sub-panel and reset the GFCI breaker. Close and secure the sub-panel door.

3. The jet pump, heating system and all internal plumbing will achieve a partial prime as the spa is filled. To check the operation of the jet system and remove any remaining air from the heating system, push the JETS button twice to make the jet pump run on high speed for one minute. Once the jet system is fully operational (as indicated by strong, non-surging jets), priming of the spa is complete.

   IMPORTANT: The air control which is located on the top of the spa shell and labeled "Comfort Control®" should be set to the MAX position when checking jet operation. Always turn the air control to the MIN position anytime the spa is not being used. This will help to make the spa operate more quietly and heat more efficiently when the cover is in place.

4. Adjust Total Alkalinity (TA) to 80 ppm, Calcium Hardness (CH) to 100 ppm, then spa water pH to between 7.4 and 7.6. These procedures are listed in the "Water Quality and Maintenance" section.

   IMPORTANT: Add spa water chemicals directly into the filter compartment after activating Clean cycle (press SET, then JETS button.)
   OPERATION NOTE: Adjusting the Total Alkalinity as the first step is important, as out-of balance TA will affect your ability to adjust the pH correctly and will prevent the sanitizer from operating effectively.

5. Superchlorinate the spa water by adding 1-1/2 teaspoon of chlorine (sodium dichlor) per 250 (950 liters) gallons of spa water. The Clean cycle needs to be activated before adding chlorine.

6. Set the temperature control to the desired temperature between 100°F and 104°F (38°C and 40°C), then place the vinyl cover on the spa and allow the water temperature to stabilize (approximately 24 hours). Make sure you secure the cover in place using the cover locks. Periodically check the spa water temperature. When the water temperature climbs above 90°F(32°C), proceed to the next step.

7. Push the SET button then the JETS button to activate the Clean cycle and circulate the spa water. After the Clean cycle is complete, test the spa water for Free Available Chlorine (FAC) residual. If the residual is between 3 and 5 ppm on the test strips (found in the test kit) go on to the next step. If the residual is less than 3 ppm, superchlorinate the spa water by adding 3/4 teaspoon of chlorine (sodium dichlor). Push the SET button, then the JETS button to activate Clean cycle for 10 minutes.

8. Recheck the Total Alkalinity (TA) at 80 ppm, Calcium Hardness (CH) at 100 ppm, then spa water pH at between 7.4 and 7.6.

   Operational Note: Make sure you adjust your Total Alkalinity first, as an out-of-balance condition will affect your ability to adjust the pH correctly, and will prevent the sanitizer from operating effectively. **The spa is ready for use when the chlorine level remains between 3 ppm and 5 ppm.**

9. The spa temperature is pre-programmed to reach 102°F (39°C), and will normally do so within 18 to 24 hours; thereafter, the water will remain within 3°F (1.5°C) of the set temperature.

OPERATION NOTES:

1. The Solana® spa is equipped with a 10-minute Tranquil Mode timer delay on the heating/maintenance mode. Whenever the high speed mode of the jet pump has been turned off, it will take 10 minutes before the low speed of the jet pump and heater become activated, unless the JETS button is pushed again. Always push the JETS button to turn off the jet pump when exiting the spa. In the standard 115 volt, 20 amp electrical configuration, the heating system does not operate simultaneously with the high speed pump. On the other hand, in the optional 115-volt, 30 amp system, the heating system does operate simultaneously with the high speed pump.
2. The spa controller has an automatic two-hour "time-out" feature should the high-speed jet mode be left on inadvertently. **After two hours of continuous operation, the controller will automatically return to the maintenance/heating mode.**
3. The spa controller also has a six-hour "time out" feature should the light be left on inadvertently. **After six hours of continuous operation, the controller will automatically turn the light off.**

HEATING AND HYDROMASSAGE SYSTEMS

The Solana spa uses a two-speed jet pump to operate its hydromassage jets and to circulate the spa water through the heating system. The low-speed mode of the pump, which is activated automatically by the control thermostat, will cause the spa water to be drawn slowly in through the filter and into the pump. The pump, in turn, will push the water back into the spa through the heater and jets. When the JETS button is pushed one time, the spa user can activate the low-speed filtration cycle of the jet pump. (The heater may or may not be on, depending on whether the control thermostat has indicated a demand for heat.) When the JETS button is pushed a second time, the high speed operation cycle of the jet pump will be activated. (This will automatically deactivate the heater if it is operating in a standard 20 amp system.)

In the optional 115 volt, 30 amp electrical system, if a drop in the water temperature has occurred, the spa heater will operate simultaneously when the jet pump is operating on high-speed. On the other hand, in a standard 115 volt, 15 or 20 amp electrical system, the spa heater will not operate simultaneously when the jet pump is operating on high-speed, even if a drop in the water temperature has occurred. In either electrical configuration, when the high-speed mode of the jet pump is turned off, the spa will enter a ten-minute "tranquil mode." During this time the heating system (and simultaneous operation of the jet pump at low-speed) will not operate (unless the JETS button is pushed), even if the water temperature has dropped below the control setting. Once the 10-minute period has expired, the spa controller will switch to the maintenance mode and the heating system will be automatically activated.

The Solana spa is equipped with a state-of-the-art heating system. The system uses an exclusive No-Fault® stainless steel, high watt density heater.

Under normal conditions, the heater and low-speed cycle will run 2-4 times per day for approximately 20 minutes per cycle. If the ambient temperature falls below 20°F (-7° C), the heater may not be able to raise the spa water to the desired temperature, and the heater and low-speed cycle will run continuously, resulting in substantially higher operating costs.

Filter Cycle



When the spa is first powered up the automatic filter cycle will wait 10 minutes before starting. Your spa will automatically turn the filter cycle on for 60 minutes on low speed. The second filter cycle will activate for 30 minutes, 12 hours later. The filter cycle icon, F1 or F2, will be displayed in the control panel.

Note: The optional FreshWater® III ozone system only works during the filter cycles.

The filtration is suspended when the ambient temperature remains high for more than 3 hours. In this scenario, the heater will not cycle on because the spa water temperature does not cool. If the heater does not cycle on, the low-speed jet pump will not automatically engage. This is very critical when using the FreshWaterAg+® silver ion purifier, which relies on circulation to disperse silver ions throughout the spa. When engaged, the circulation switch will activate the low-speed jet pump for a 1.0 hour filter cycle. If, during the filter cycle, a user enters the spa and turns on the high-speed jet pump, the filter cycle will pause. When the high-speed pump is shut off, the filter cycle will resume.

The filter cycle begins when the timer is activated. Thereafter, the filter cycle will repeat for the same time every 12 hours. The only exception occurs in the event of a power failure. If power is disconnected from the spa while the circulation timer is activated, the circulation cycle will reset and engage when power is reapplied. Therefore, if you have activated the timer at 8 am, the low speed jet pump will be activated from 8 am to 9:30. The cycle will repeat again after 12 hours. However, if a power failure occurs at 10 am, and power is reapplied at 10:30 am, the cycle will reset and the low speed jet pump will activate from 10:30 am to 12:00 pm.

To activate the Filter timer:

To modify the length of either filter cycle:

A. Press and hold the SET button for approximately three seconds.

B. Press the LIGHT button to select filter cycle 1 or 2 (F1 or F2 will be displayed).

C. Using the Temp Up (▲) or the Temp Down (▼) button, adjust the value as desired, from 0 to 6 hours.

D. Programming will then be saved, 10 seconds after last button is pressed. The display will then revert back to temperature display.

The filter cycle will activate the jet pump on low-speed for the entire cycle. When activated, the filter cycle Icon on the display is turned on. If the temperature exceeds the set point by three degrees F for more than three hours, the system will cancel the FILTER cycle and



the filter Icon will blink for the remaining filter cycle time. Should the temperature cool down to 1.5 degrees F below the set point before the end of the cycle, the cycle will resume for the rest of the time. Should you use the spa during the filter cycle by placing the jet pump on high-speed, the Filter Icon will blink. Once the jet pump has been shut off, a ten minute tranquil mode begins (FILTER Icon will be blinking during tranquil mode) before the filter cycle will resume. The blinking filter Icon indicates that the filter cycle timer is still counting, but the cycle has been temporarily interrupted.

NOTE: The interrupted time of a filter cycle is not extended after the filter cycle resumes. Power interruptions of the spa will reset the filter cycle to the default cycle time and begin 10 minutes after spa regains power.

Clean Cycle



The Clean Cycle has been provided as a convenient timer for water maintenance. When the Clean Cycle is initiated, the jet pump will activate in high speed. The jet pump symbol will flash on and off until the cleaning cycle is complete. The total cleaning cycle time is ten minutes. If the clean cycle does not engage, make sure the SPA LOCK is deactivated. To activate the Clean Cycle, Press the SET button followed by the JETS button.

Sleep Mode



The Sleep Mode operation is a feature that minimizes pump operation during quiet evening hours. For example, if Filter Cycle 1 is set to activate at 8:00 a.m., by default Filter Cycle 2 will be set to activate at 8:00 p.m. (12 hours later). During 8:00 p.m. to 8:00 a.m., if the spa should call for heat, the pump and heater will activate to heat the spa under normal temperature demand. However, when in Sleep Mode, should the spa call for heat, the pump and heater will be suspended after Filter Cycle 2 until the activation of Filter Cycle 1, at 8:00 a.m. to minimize pump activation during quiet evening hours.

Important: Power-up of the spa starts the F1 default sequence. In order for the Sleep Mode to work in the evening hours, the spa must be powered up in the early morning hours. The Sleep Mode will always be active the 6-12 hours between the end of (F2) and the begining of (F1) depending on how the filter cycle program is set.

Note: if temperature drops below 80 degrees, heater will automatically activate to prevent spa from freezing.

To activate Sleep Mode feature, press and hold Temp Up (▲) & Temp Down (▼) buttons together for 3 seconds. This will activate the feature and override the normal temperature demand. When these buttons have been engaged, a Moon & Stars icon (Sleep Icon) will appear in the display of the control panel, indicating this feature has been activated. To deactivate this feature, simply press and hold

Temp Up (▲) & Temp Down (▼) buttons together for 3 seconds again.

LOCKING FEATURES

The locking features, TEMPERATURE LOCK and SPA LOCK, are enabled from the control panel by a specific combination of buttons. Once enabled, a lock will remain active until the specific button combination is applied to disable the lock. Even if power is disconnected from the spa and soon thereafter reapplied (such as a power outage), the lock will remain in place.

Spa Lock

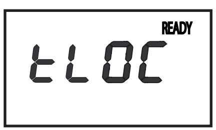


The Spa Lock feature deactivates all of the functions of the control panel, it is generally used to prevent unwanted use of the spa.

To activate the Spa Lock, press SET button. When the SET icon flashes press the Temp Down (▼) button. Do not press any other button on the control panel until the SET icon stops flashing. SLOC is then displayed.

To deactivate the Spa Lock, press SET button. When the SET icon flashes press the Temp Down (▼) button. Do not press any other button on the control panel until the SET icon stops flashing. SLOC is no longer displayed.

Temperature Lock



The Temperature Lock feature deactivates the temperature control function from the control panel. All other functions on the control panel will operate normally. Temperature Lock is most often used by those who do not want others to change the set temperature of the spa water.

To activate the Temperature Lock, Press SET button. When the SET icon flashes press the Temp Up (▲) button. Do not press any other button on the control panel until the SET icon stops flashing. TLOC is then displayed. To deactivate the Spa Lock, press SET button. When the SET icon flashes press the Temp Up (▲) button. Do not press any other button on the control panel until the SET icon stops flashing. TLOC is no longer displayed.

Moto-Massage® Jet

The Moto-Massage jet automatically travels up and down in a sweeping motion, simulating the natural stroking effects of a manual massage. The intensity and speed of the Moto-Massage jet may be adjusted by turning its Comfort Control® lever. The Moto-Massage jet has been factory adjusted to provide maximum hydromassage, and to achieve full vertical travel with its Comfort Control lever in the full air volume position. Should the Moto-Massage® jet not achieve full vertical travel and the problem is not a closed air control valve, a pump set on low-speed, or a clogged filter cartridge, then your Solana® Spa Service Center should be contacted.

SERVICE NOTE: A slow or non-moving Moto-Massage jet may indicate that the filter cartridge pores are obstructed with dirt, body oils, or calcification. Follow the filter cartridge cleaning procedures in the Spa Care and Maintenance section of this manual.

ACCESSORY NOTE: For a different-feeling massage, ask your dealer about the HydroPulse® option, an alternative faceplate for your Moto-Massage jet.

Hydromassage Jets

A. On the TX spa, the hydromassage jet features a dual-port rotary nozzle while on the SX both directional and dual-port rotary nozzles are used. The intensity of this jet is determined by the volume of air which is introduced into the jet chambers, where it mixes with the water stream. The Comfort Control® lever is used to change the intensity of this jet. The jet is also individually adjustable; simply turn the faceplate clockwise to decrease the jet pressure or counterclockwise to increase the jet pressure.

ACCESSORY NOTE: Ask your Solana Spa Dealer about Rotary or Directional Hydromassage Jet Kits, which can be installed easily in your spa in place of the directional or rotary nozzle to vary the effect of the jet.

The nozzles can be removed by grasping the nozzle and gently pulling away from the jet faceplate. To install a new nozzle, align the four prongs on the rear of the nozzle with the four holes in the interior of the jet faceplate and press the nozzle into place. The nozzle will snap into place.

Precision® Jets

Precision® Jets are designed to perform a soft, soothing massage on your back and shoulders. Adjust their pressure using the Comfort Control lever.

SAFETY EQUIPMENT

A. GFCI: The Ground Fault Circuit Interrupter, located on the end of the power cord, is a safety device that is designed to sense as little as 5 milliamps of electrical current leakage to ground. It is very important to protect a GFCI from rain and other moisture. Watkins Manufacturing Corporation recommends that the GFCI be tested before each use to ensure it is functioning correctly.

TO TEST THE GFCI:

Before each use, with the spa operating, push the TEST button (located on the front of the GFCI). The GFCI breaker should trip to the "off" position, disconnecting power to the spa. Reset the GFCI by pushing the RESET button. The spa will now operate normally. If the interrupter does not perform in this manner, it is an indication of an electrical malfunction and the possibility of an electric shock. Unplug the spa until the fault has been identified and corrected.

B. HEATER HIGH-LIMIT SWITCH: The heater high-limit sensor is located on the heater assembly. If for any reason the internal temperature of the heater exceeds 120°F (49°C), the high-limit circuit will trip and turn off the spa. The control panel display will display - - - -. The heater high-limit may be reset when the water temperature within the heater has cooled to approximately 110°F (43°C). Reset the heater high-limit by simply disconnecting power to the spa for thirty seconds. The cause of the overheating must be located to prevent a recurrence. The most common cause of limit-tripping is inadequate water flow through the heating system. This may be caused by an obstruction within the pump water lines (filter, pump intakes or internal plumbing), the non-function of the low-speed mode of the jet pump, or the malfunction of the control thermostat. Once the cause has been identified and corrected, and the sensor has cooled, reset spa by simply disconnecting power to the spa for thirty seconds.

C. PRESSURE SWITCH: The pressure switch is located inside the control box on the heater, and is designed to prevent heater operation during a no or low flow condition. If for any reason flow through the heater is reduced or stopped, the pressure switch will trip. If the pressure switch has detected a no or low flow condition –:–:–:– will display . The most common causes of inadequate heater flow are a dirty or clogged filter, obstruction in the plumbing lines, and non-operation of the low speed heat pump. Additionally, the control panel display will display – – – – if the pressure switch senses flow through the heater when the jet pump is not activated. Contact your Authorized Service Technician.

D. CONTROL THERMOSTAT: The control thermostat helps regulate the temperature of the water. If for any reason something were to happen to this device, the READY icon on the control panel will flash. Contact your Authorized Service Technician.

COMFORT CONTROL® SYSTEM

COMFORT CONTROL VALVE: Turning the Comfort Control selector to MAX allows for the same volume of air to flow to all Moto-Massage® jets and Precision® jets simultaneously. On the Solana®, the jet faceplate is then used to control the intensity of the rotary or directional hydromassage jets.

NOTE: Always turn the Comfort Control selector to the MIN position anytime the spa is not being used. This will help make the spa operate more quietly and heat more efficiently when the vinyl cover is in place.

SPA CONTROL PANEL

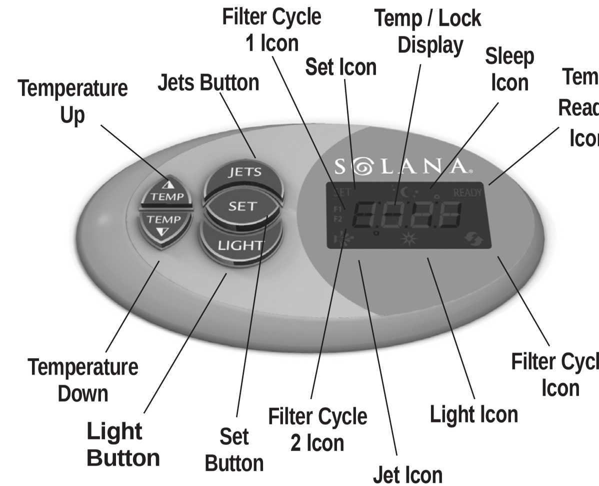
A. JETS BUTTON: Use the JETS button to activate the jet pump. Pushing the



JETS button once will activate the jet pump on low speed. The low speed should be used as a filtration cycle rather than as an operation cycle. Pushing it a second time will activate the high speed mode of the jet pump. A third push will deactivate the jet pump.

NOTE: The Moto-Massage® jet (available on the TX spa) will not function properly with the jet pump on low speed.

The jet icon in the display will illuminate whenever the jet pump is activated (either high or low speed) using the JETS button.



B. LIGHT BUTTON: The Solana® spa is equipped with a blue LED spa light.



Push the LIGHT button to turn it on. Push it a second time to turn the light to a medium light intensity, a third time for a low intensity and a fourth time will turn it off. When the light is activated, the light icon in the display will illuminate. For enhanced spa enjoyment, an optional six color wheel light feature is available to create your desired ambiance.

C. SPLENDORS® LED LIGHTING (OPTIONAL):

The Splendors LED lighting system allows you to brighten up your spa experience through different multicolor lights: red, blue white, purple, amber, and aqua. You can choose one stationary color or you can cycle through all the colors with the automatic color wheel.

To install Splendors LED lights, simply remove the light reflector by rotating counterclockwise and pull the factory installed light board out. Install the new light fixture and reinstall the light reflector by rotating clockwise to complete the installation.
To activate, press the SET button followed by the LIGHT button. To select a specific color, push the LIGHT button (if within 5 seconds) while the desired color is displayed. If 5 seconds have passed, after color wheel activation, you will need to press SET followed by LIGHT to select the specific color. The Splendors LED lighting option is a great way to personoalize your spa experience.

D. TEMPERATURE CONTROLS: The set temperature range is from 80°F to 104°F (27°C to 40°C). The temperature of any setting may rise slightly depending on the current use and condition of your spa, and outside temperature.



Whenever power is disconnected and then reconnected to the spa, the water temperature will automatically return to the last temperature set in the program.

Pressing the Temp Up (▲) button displays the spa's set temperature. To increase the set temperature, press the Temp Up (▲) button again, once for each degree of increased temperature desired. If you hold the button down, the set temperature will increase by one degree every half-second.

To decrease the set temperature, press the Temp Down (▼) button, once for each degree of decreased temperature desired. If you hold the button down, the set temperature will decrease by one degree every half-second.

E. FILTER CYCLE ICON: The filter cycle icon will illuminate when the filter cycle is activated. See the filter cycle section of this manual for instructions on activating the filter cycle.



IV. SPA CARE AND MAINTENANCE

Your Solana® spa is manufactured from the highest quality, most durable materials available. Even so, the spa care and maintenance program you develop will ultimately determine how long your spa and its individual components will last. Regular maintenance and following the advice in this section will help you to protect your investment.

DRAINING THE WATER

Detergent residues from bathing suits and soap film from your body may gradually accumulate in your spa's water. Normally, in about four months the water will become sudsy and should be replaced. Showering without using soap prior to entering the spa or using only the rinse cycle when laundering your bathing suit will help to reduce detergent residue in the spa water. **Important:** Remember to change your water every three to four months.

To Drain Your Spa:

1. Disconnect the spa from the power supply by the appropriate method:

   Standard 115 volt, 20 amp model - Disconnect the power cord from the house receptacle.

   Converted 115 volt, 30 amp models - Trip the GFCI breaker located in the sub-panel.

2. On the SX, remove the screws from the equipment access door and remove the door completely. Locate the main drain valve for the spa and remove the drain cap. Attach the inlet of a garden hose to the drain valve (to avoid flooding of the foundation surrounding the spa) and route the outlet of the hose to an appropriate draining area.

   On the TX spa, locate the main drain valve on the left side of the spa and remove the drain cap. Attach the inlet of a garden hose to the drain valve (to avoid flooding of the foundation surrounding the spa) and route the outlet of the hose to an appropriate draining area.

   NOTE: Spa water with a high sanitizer level may harm plants and grass.

3. Open the valve by turning the knob counterclockwise. The spa will drain almost completely by gravitational flow. Any remaining water should be removed using a soft towel.

   IMPORTANT: All Solana spa models will drain almost completely through the main drain valve. Use a soft towel to remove any remaining water. Equipment such as the jet pump and heating system will drain. Any water remaining within the plumbing after draining will only need to be removed if the spa is being winterized.

4. When empty, inspect the spa shell and clean as required. (Follow the Care of the Exterior Finish instructions.)

5. Remove the filter cartridge and clean as required (see the Filter Maintenance section).
6. Replace the filter cartridge.
7. Close the drain valve and reinstall the drain cap. Reattach the equipment access door on the SX spa.
8. Refill the spa through the filter compartment BEFORE restoring power.

   IMPORTANT: Always clean the filter cartridge each time the spa is drained for cleaning. Always sanitize and chemically balance the spa water after cleaning and refilling the spa.

FILTER MAINTENANCE

As with any water filtering system, the filter cartridge may become clogged, resulting in reduced water flow. In your Solana® spa, it is important to maintain a clean, unobstructed filtering system to ensure maximum performance from the jets. Watkins Manufacturing Corporation recommends the filter cartridge be cleaned with a filter cleaner at least once every month.

⚠ **WARNING:** The frequency and duration of use, and the number of occupants all contribute to determining the appropriate time between filter cleanings. More use means that more frequent filter cleanings are required. Failure to maintain the filter cartridge in a clean, unobstructed condition will result in reduced water flow through the heater assembly that may cause the High Limit Thermostat or Pressure Switch to trip. If this High Limit or Pressure Switch trip occurs during sub-freezing temperatures and goes unnoticed, the spa water may freeze. Any damage to the spa (due to freezing) caused as a result of poor maintenance (stated under misuse or abuse in the Solana Spa Limited Warranty), will not be covered by your spa warranty.

DANGER: To reduce the risk of injury to persons using the spa, DO NOT use the spa with the filter cartridge or filter standpipe removed!

Filter Cartridge Removal and Cleaning

1. Disconnect power to the spa.
2. Remove and carefully set aside the filter compartment cover.
3. Remove any floating items from within the filter compartment.
4. Turn the filter retainer handle (located on the top of the filter cartridge) counterclockwise until the retainer can be removed from the filter standpipe.
5. Remove the filter retainer and cartridge.

SERVICE NOTE: Never remove the filter standpipe. Debris may find its way into the internal plumbing which may result in blockage. NEVER REMOVE SUCTION FITTINGS.

6. Always clean the filter using a filter degreaser to remove mineral and oil buildup. Simply soak the filter in the degreaser (according to the degreaser directions), then place the filter on a clean surface and spray until clean using a garden hose. It may be necessary to rotate the filter while spraying to remove any debris lodged between the filter pleats.
7. To reinstall the filter cartridge, reverse the order of steps in which it was removed. Do not overtighten!

CARE OF THE EXTERIOR FINISH

Spa Shell

Stains and dirt generally will not adhere to your spa's surface. **Most household chemicals are harmful to your spa's shell.** Sodium bicarbonate (baking soda) can be used for minor surface cleaning. A soft rag or sponge should easily remove most dirt. Always thoroughly rinse off any spa shell cleaning agent with fresh water.

Cleaning of the surface at the waterline to remove any body oil or "bathtub ring" can be done easily with baking soda and a soft sponge. When your spa has been drained for cleaning, the use of a spa/tub surface cleaner is recommended to clean the spa shell. The use of a soft rag or soft sponge should easily remove most dirt build-ups. Always thoroughly rinse off any spa shell cleaning agent with fresh water. The use of a spa polish is recommended after the spa shell has been dried, to polish the surface.

The procedure to remove a light surface or burnish mark is quite simple. Apply paste wax or automobile rubbing compound to the scratch and then mildly buff the area. This will return the original luster and shine to the marred spa shell surface.

SERVICE NOTES:

1. Iron and copper in the water can stain the spa shell if allowed to go unchecked. Ask your Solana® Spa Dealer about a Stain and Scale Inhibitor to use if your spa water has a high concentration of dissolved minerals.
2. The use of alcohol or any household cleaners other than those listed to clean the spa shell surface is NOT recommended. DO NOT use any cleaning products containing abrasives or solvents since they may damage the shell surface. **NEVER USE HARSH CHEMICALS!** Damage to the shell by the use of harsh chemicals is not covered under the warranty.
3. Your Dealer may also stock products which can be used in your spa to help control "bathtub ring."

IMPORTANT: Some surface cleaners contain eye and skin irritants. Keep all cleaners out of the reach of children and use care when applying.

Spa Siding

The spa siding of the Solana® TX spa is manufactured from Endurol®, a durable U.V.-resistant material. Even so, monthly cleaning and periodic conditioning is recommended to maintain its beauty. The spa siding of the Solana SX has a simulated wood cabinet that consists of a rigid polymer that combines the durability of plastic, with the beauty of wood. Simulated wood won't crack, peel, blister, or delaminate even after prolonged exposure to the elements. To clean and condition the siding:

Indoor spa use:

1. Using a large sponge or soft cloth, and using a very mild soap solution (1 teaspoon dishwashing liquid with 2 gallons or 8 liters of warm water), scrub the surface in a circular motion. Use care not to let the siding dry with a soap film on it before it can be rinsed clean.
2. Use a second sponge or soft cloth with clean cold water to remove the cleaning solution.

Outdoor spa use:

1. With a garden hose, lightly spray the siding to rinse away and loosen any dirt or debris.
2. Using a large sponge or soft cloth, and using a very mild soap solution (1 teaspoon dishwashing liquid with 2 gallons or 8 liters of warm water), scrub the surface in a circular motion. Use care not to let the siding dry with a soap film on it before it can be rinsed clean.
3. Lightly spray the spa siding to rinse away the cleaning solution.

IMPORTANT: To avoid soap getting into the spa water, the vinyl spa cover should be left on the spa during cleaning and rinsing.

Vinyl Cover

The Solana spa comes with a vinyl cover. The vinyl spa cover is an attractive, durable foam insulation product. Monthly cleaning and conditioning are recommended to maintain its beauty. To clean the cover, first remove it from the spa. It should not be on the spa during cleaning.

To clean and condition the vinyl cover:

Indoor spa use:

1. Using a large sponge and/or a soft bristle brush, and using a very mild soap solution (1 teaspoon dishwashing liquid with 2 gallons or 8 liters of warm water) or baking soda (sodium bicarbonate), scrub the vinyl top in a circular motion. Do not let the vinyl dry with a soap film on it before it can be rinsed clean.

2. Rinse off the underside of the cover with water only (do not use soap), and wipe it clean with a dry rag.
3. To condition the cover after cleaning, apply a thin film of Hot Spring® FreshWater® Cover Shield to the vinyl surface and buff to a high luster.

OUTDOOR SPA USE:

1. With a garden hose, spray the cover to loosen and rinse away dirt or debris.
2. Using a large sponge and/or a soft bristle brush, and using a very mild soap solution (1 teaspoon dishwashing liquid with 2 gallons or 8 liters of warm water) or baking soda (sodium bicarbonate), scrub the vinyl top in a circular motion. Do not let the vinyl dry with a soap film on it before it can be rinsed clean.
3. Scrub the cover's perimeter and side flaps. Rinse clean with water only.
4. Rinse off the underside of the cover with water only (do not use soap), and wipe it clean with a dry rag.
5. To condition the cover after cleaning, apply a thin film of Cover Shield to the vinyl surface and buff to a high luster.

   SERVICE NOTE: To remove tree sap, use cigarette lighter fluid (<u>not</u> charcoal lighter fluid). Use sparingly, and rinse with a saddle soap solution immediately afterwards, then wipe dry.

IMPORTANT REMINDERS:

- **DO** lock cover straps to secure the cover when the spa is not in use.
- **DO NOT** drag or lift the spa cover using either the flaps or the tie-down straps.
- **DO NOT** walk, stand, sit, or place heavy objects on the cover.
- **DO NOT** place any metal or heat transferring object on the cover or place any type of plastic tarp or drop cloth over the cover as this may result in a melted foam core, which would not be covered under the warranty.
- **DO NOT** use any lifting mechanisms, chemicals or cleaners except those recommended by Watkins Manufacturing Corporation or its Authorized Sales and Service Dealer.

IMPORTANT: Whenever the spa is not in use, it is essential that the cover be in place. When filled, this ensures effective temperature maintenance and economical operation. When empty, this prevents potential damage to the surface finish of the interior walls. In outdoor use, this can result from the excessive heat of the sun. This type of damage is specifically excluded from warranty coverage.

CARE OF THE SPA PILLOW

The spa pillows will provide years of comfort if treated with care. The pillows have been positioned above the water level in order to minimize the bleaching effects of chlorinated water and other spa water chemicals. To extend their life, whenever the spa shell is being cleaned, the spa pillows should be removed and cleaned. Remove body oils with a mild soap and water solution. ALWAYS rinse off the spa pillows thoroughly to remove any soap residue. The pillows may be conditioned with Hot Spring® Cover Shield after cleaning. If the spa is not going to be used for a long period of time (that is, during a vacation or if the spa is to be winterized), or when the spa water is being super-chlorinated, the spa pillows should be removed until the next use of the spa.

To remove and replace the spa pillow:

1. Carefully lift the pillow away from the spa, gripping the top center of the pillow.
2. Continue lifting until the top pillow retainer is released from the pillow.
3. Pull and roll the top of the pillow towards the bottom to release the bottom retainer from the pillow.
4. To reinstall the spa pillow, carefully align the lower retainer on the spa with the lower receiving hole on the pillow. Bend the pillow slightly to allow the lower retainer to slip over the receiving hole on the pillow.
5. Keeping the pillow slightly bent, slide the upper retainer into the upper receiving hole of the pillow.
6. After the second pillow retainer is in place, press the pillow down into the recess in the spa shell.

VACATION CARE INSTRUCTIONS

If you plan to be away, follow these instructions to ensure the water quality of your spa is maintained:

SHORT TIME PERIODS (3-5 DAYS):

1. Adjust the Total Alkalinity, Calcium Hardness and pH by following the instructions outlined in the Water Quality and Maintenance section.
2. Sanitize the water by following the shock procedures also listed in the Water Quality section. Make sure the air control is turned to the OFF position.
3. Lock your cover in place using the cover-locks.
4. Upon your return, sanitize the water by following the shock procedures, and balance the pH.

Long Time Periods (5-14 Days):

Prior to leaving:

1. At least one day before you leave, set the temperature to 80°F (27°C).

   IMPORTANT NOTE: Spa water oxidizers such as sodium dichlor chlorine maintain their level of effectiveness substantially longer in warm water 80°F (27°C) than in hot water (101°F to 104°F, 38°C to 40°C).

2. Adjust the Total Alkalinity, Calcium Hardness and pH as required. Sanitize the water by following the shock procedures.

Upon your return:

3. Sanitize the water by following the shock procedures. Return the set temperature to its original setting. The spa water will be safe for you to use once the Free Chlorine Residual level has dropped below 5.0 ppm.

   NOTE: If you will not be using your spa for an extended period of time (in excess of 14 days) and an outside maintenance service (or neighbor) is not available to assist with the water maintenance, draining or winterizing of the spa is recommended.

PREVENTION OF FREEZING

Your spa has been designed and engineered for year-round use in any climate. In some areas, extremely cold temperatures (below 10°F) combined with strong wind, may cause partial freezing of the jet pump, even though the water inside the spa remains at the selected temperature. The energy efficiency of the spa may also decrease during these cold periods, as the heater will cycle more frequently. As an additional precaution against partial freezing of some of the components, the equipment compartment can be insulated with an insulating kit (available from your local dealer). This insulating kit will also help to maximize the spa's energy efficiency.

NOTE: When warmer weather returns (approx. 60°-70°F), the insulating kit must be removed to prevent overheating of the jet pump.

Winterizing you spa

If you leave the spa unused for a long period of time in severely cold weather, you should drain the spa and winterize it to avoid accidental freezing due to a power or equipment failure.

Danger: Use only Propylene Glycol as your anti-freeze (available at most RV or marine supply stores). This is non-toxic. Never use an automobile anti-freeze (Ethylene Glycol) since it is toxic!

Warning: Failure to follow these instructions correctly can lead to freeze damage not covered by warranty. It is strongly recommended that you contact your local dealer to perform this service

1. Drain your spa following the Draining Your Spa section in the owner's manual.
2. Remove the filter cartridge, clean and store in a dry place.

IMPORTANT: These additional instructions must be utilized when draining and winterizing your spa in climates where the temperature falls below 32°F (0°C). A five (5) gallon combination (vacuum/blower) wet/dry shop vac must be used to effectively remove water that is trapped inside the plumbing lines.

3. Attach the vacuum's hose to the blower side of the shop vac.
   a) Place the end of the vacuum hose down the filter opening.
   b) Turn on the blower function and allow it to blow out any water remaining in the plumbing lines (approximately 3 to 5 minutes).
4. Attach the vacuum hose to the vacuum side of the shop vac. Vacuum all openings and orifices as follows:
   a) Jet openings: start with the jets at the top and move downward (if suction is coming from another jet, block off the other jet using a large rag – this will help pull out the water that is trapped deeper inside the main line).
   b) Filter suction fittings and filter compartment.
   c) Main drain outlet (it may be necessary to cover the drain grate tightly with a rag when vacuuming the main drain to ensure water is drawn completely from the internal plumbing system).
5. Thoroughly dry the spa shell with a clean towel.
6. Replace the main drain cap.

CAUTION: Use only Propylene Glycol as your anti-freeze. This is non-toxic. Never use an automobile anti-freeze (Ethylene Glycol) since it is toxic!

7. Using a long-extension funnel, pour anti-freeze into all standpipes, filter suction fittings, and jet orifices. Add enough anti-freeze to ensure adequate protection – in many cases, you will see the liquid in the orifice, or coming out of another location.
8. Close the spa cover and fasten the cover tie downs. Cover the spa cover with two pieces of plywood to evenly distribute the weight of snow and ice. Secure a plastic sheet, or tarp, over the spa cover and plywood.
9. Replace the equipment access door, if removed.

Opening Instructions:

1. Remove plywood and plastic sheet. Open the spa cover by unfastening the cover tie downs.

2. Open drain to remove anti-freeze. Replace drain cap.
3. Follow the Start-up and Refill Procedures in the Operating Instructions section of the Owner's Manual. Do not install filters to prevent them from exposure to the anti-freeze.
4. As part of this process, superchlorinate the spa water by adding three teaspoons of chlorine (sodium dichlor) per 250 gallons of spa water into the filter compartment. This is twice the normal amount of chlorine needed for superclorination. This extra amount of chlorine is needed to destroy the anti-freeze.

NOTE: A defoamer may be needed to decrease the amount of foam caused by the anti-freeze.

5. Drain your spa to ensure removal of anti-freeze. Do not drain water on grass or plants due to excessive chlorine level.
6. After the spa has completely drained, re-install your filter and follow the Start-up and Refill Procedures in the Operating Instructions section of the Owner's Manual.

IMPORTANT: Always keep spa covered when not in use, whether it is empty or full.

V. WATER QUALITY AND MAINTENANCE

It's important to have clean water. Water maintenance is one of the least understood, yet most important areas of spa ownership. Your dealer can guide you through the process of achieving and maintaining perfect water in your spa, given your local conditions. Your program will depend on your water's mineral content, how often you use your spa, and how many people use it.

Watkins recommends that you either use an entirely chlorine-based system, or an alternative system which uses silver ions (the FreshWater$_{Ag^+}$® silver ion purifier). Watkins recommends the use of Hot Spring® FreshWater® products. These are available from authorized Hot Spring Dealers.

GENERAL INFORMATION

THE THREE FUNDAMENTAL AREAS OF WATER MAINTENANCE:

- *WATER FILTRATION*
- *CHEMICAL BALANCE/pH CONTROL*
- *WATER SANITATION*

Water Sanitation is the responsibility of the spa owner, achieved through the regular and periodic (daily, if necessary) addition of an approved sanitizer. The sanitizer will chemically control the bacteria and viruses present in the fill water or introduced during use of the spa. Bacteria and viruses can grow quickly in undersanitized spa water.

The water's chemical balance and pH control are also the responsibility of the spa owner. You'll have to add chemicals to maintain proper levels of Total Alkalinity (TA), Calcium Hardness (CH) and pH. Proper water balance and pH control will minimize scale buildup, extend the life of the spa, and allow the sanitizer to work at top efficiency.

METHODS FOR TESTING THE SPA WATER

Accurate water testing and analysis is an important part of effectively managing your spa water. You must have the ability to test for:

- Total Alkalinity (TA)
- pH
- Calcium Hardness (CH)
- Sanitizer

Two types of testing methods are recognized and recommended by Watkins:

The Reagent Test Kit is a method which provides a high level of accuracy. The reagents come in either liquid or tablet form.

Test Strips are a convenient testing method used by many spa owners. Keep in mind that test strips are susceptible to heat and moisture contamination, which will result in inaccurate readings.

IMPORTANT: Always read and carefully follow the directions included with the Test Kit or Test Strips to ensure the accuracy of the test results.

Basic Chemical Safety

When using chemicals, read the labels carefully and follow directions precisely. Though chemicals protect you and your spa when used correctly, they can be hazardous in concentrated form. Always observe the following guidelines:

- Allow only a responsible person to handle spa chemicals. Keep them out of the reach of children.
- Accurately measure the exact quantities specified, never more. Do not overdose your spa.
- Handle all containers with care. Store in a cool, dry, well ventilated place.
- Always keep chemical containers closed when not in use. Replace caps on their proper containers.

- Don't inhale fumes or allow chemicals to come in contact with your eyes, nose, or mouth. Wash your hands immediately after use.
- Follow the emergency advice on the product label in case of accidental contact, or if the chemical is swallowed. Call a doctor or the local Poison Control Center. If a doctor is needed, take the product container along so that the substance can be identified.
- Don't let chemicals get on surrounding surfaces or landscaping.
- Don't use a vacuum cleaner to clean up chemical spills.
- Never smoke around chemicals. Some fumes can be highly flammable.
- Don't store any chemicals in the spa equipment compartment.

How To Add Chemicals To The Water

IMPORTANT: All spa water chemicals, including granulated dichlor, MPS, granulated pH increaser or decreaser, granulated total alkalinity increaser, calcium hardness increaser, liquid stain and scale inhibitor, and liquid de-foamer must always be added directly into the filter compartment while the jet pump is running in high speed mode, and it must run for a minimum of ten minutes.

To administer spa water chemicals:

1. Fold back the cover. Carefully remove and set aside the filter compartment cover.
2. Push the JET button twice to turn the jet pump on in its high speed mode.
3. Carefully measure the recommended amount of chemical and slowly pour it into the filter compartment. Use care not to splash chemicals on your hands, in your eyes, on the spa shell surface or on the siding.
4. Replace the filter compartment cover. After ten minutes, shut off the jet pump and close and lock the cover to complete the procedure. **Risk of Drowning:** Never leave an open spa unattended!

⚠ **WARNING:** High sanitizer levels can cause discomfort to the user's eyes, lungs and skin. Always allow the sanitizer level to fall to the recommeded range before using the spa.

IMPORTANT "SUPER CHLORINATION/NON-CHLORINE SHOCK TREATMENT" NOTE: After administering a super chlorination treatment or non-chlorine shock to your spa, leave the cover open for a minimum of 20 minutes to allow the oxidizer gas to vent. A high concentration of trapped oxidizer gas which may exist as a result of the shock treatment (not daily sanitation) may eventually cause discoloration or vinyl degradation to the bottom of the cover. This type of damage is considered chemical abuse and is not covered under the terms of the limited warranty.

THE SOLANA® SPA WATER MAINTENANCE PROGRAM

Each step in your water maintenance program is dependent on the completion of the previous steps. Omitting a step or failing to reach the recommended range may cause an imbalance in your water's chemistry. Unbalanced water chemistry can damage the spa and its components as well as cause discomfort for the user.

Filling the Spa With Water

A. To prevent contaminants from entering the spa, Watkins recommends using the Clean Screen™ pre-filter when filling the spa with water. Always fill the spa through the filter compartment.

B. The Clean Screen pre-filter is designed to remove unwanted contaminants such as rust, dirt, detergents and algae, as well as metals like copper and iron, and tannins from the fill water.

C. Instructions are included with the Clean Screen pre-filter. When the spa is filled, proceed to the Start-Up and Refill Procedures section.

Balancing the Total Alkalinity (TA)

A. The recommended Total Alkalinity (TA) for your spa water is 40-120 ppm.

B. Total Alkalinity is a measure of the total levels of carbonates, bicarbonates, hydroxides, and other alkaline substances in the water. TA is referred to as the water's "pH buffer". In other words, it's a measure of the ability of the water to resist changes in pH level.

C. If the TA is too low, the pH level will fluctuate widely from high to low. Fluctuations in pH can cause corrosion or scaling of the spa components. **Low TA can be corrected by adding Hot Spring® FreshWater® pH/Alkalinity Up or sodium bicarbonate.**

D. If the Total Alkalinity is too high, the pH level will tend to be high and may be difficult to bring down. **It can be lowered by using Hot Spring FreshWater pH/Alkalinity Down or sodium bisulfate.**

E. Once the TA is balanced, it normally remains stable, although the addition of more water with a high or low alkalinity will raise or lower the TA reading of the water.

ALKALINE TUB WATER (SCALING ZONE)	8.2 7.8 7.6	ADD pH DECREASER TO LOWER pH
COMFORT ZONE	7.4	IDEAL
ACIDIC TUB WATER (CORROSIVE ZONE)	7.2 6.8 pH	ADD pH INCREASER TO RAISE pH

F. When the Total Alkalinity is within the recommended range, proceed to the next step.

Balancing the Calcium Hardness (CH)

A. The recommended Calcium Hardness (CH) level for your spa is 50-150 ppm.

B. Calcium Hardness is a measure of the total amount of dissolved calcium in the water. Calcium helps control the corrosive nature of the spa's water. That's why calcium-low water (commonly known as "soft" water) is not recommended. It is very corrosive to the equipment, and can cause staining of the spa shell. If the calcium level is too low, we recommend using Hot Spring® FreshWater® Calcium Increaser to bring the calcium hardness level to within the recommended range.

C. If the CH is too high (commonly known as "hard water"), formation of scale on the spa's shell surface and equipment can result. **CH can be decreased by using the Vanishing Act™ calcium remover according to instructions on its label.**

D. Once the CH is balanced, it normally remains stable, although the addition of more water with a high or low calcium content will raise or lower the CH reading of the water.

E. When the Calcium Hardness is within the recommended range, proceed to the next step.

THE WATKINS WATER MAINTENANCE QUICK REFERENCE GUIDE

		Ideal Range (ppm)		What Chemicals to Use	
	Steps	Min.	Max.	To Raise	To Lower
1	Total Alkalinity	40	120	Sodium Hydrogen Carbonate, or Sodium Bicarbonate	Sodium Bisulfate
2	Calcium Hardness	50	150	Calcium Hardness Increaser	The vanishing act™ Calcium Remove
3	pH	7.4	7.6		Sodium Bisulfate
4	Sanitizer	See section on Maintaining the Sanitizer Level			

Balancing the pH

A. The ideal pH level for your spa water is 7.4-7.6.

B. The pH level is the measure of acidity and alkalinity. Values above 7 are alkaline; those below 7 are acidic. Maintaining the proper pH level is extremely important for:

- Optimizing the effectiveness of the sanitizer.
- Maintaining water that is comfortable for the user.
- Preventing equipment deterioration.

C. If the spa water's pH level is too low, the following may result:

- The sanitizer will dissipate rapidly.
- The water may become irritating to spa users.
- The spa's equipment may corrode.

If the pH is too low, it can be increased by adding pH/Alkalinity Up or sodium hydrogen carbonate to the spa water.

D. If the pH level is too high, the following may result:

- The sanitizer is less effective.
- Scale will form on the spa shell surface and the equipment.
- The water may become cloudy.
- The filter cartridge pores may become obstructed.

If the pH is too high, it can be decreased by adding pH/Alkalinity Down or sodium bisulfate to the spa water.

NOTE: After adding sodium carbonate or sodium bisulfate, **wait two hours** before testing the water for pH. Measurements taken too soon may not be accurate.

E. It is important to check the pH on a regular (weekly) basis. The pH will be affected by the bather load, the addition of new water, the addition of various chemicals, and the type of sanitizer used.

F. When the pH is within the recommended range, proceed to the final step.

SOLANA WATER TREATMENT GUIDE

AT SPA STARTUP OR REFILL	Follow Start-Up and Refill Procedures section NOTE: Use the Clean Screen™ pre-filter when filling the spa to remove unwanted contaminants	
PRIOR TO EACH USE (Test before adding any chemicals; do not add any chemicals if proper or higher levels are found.)	Add one-half (1/2) teaspoon of sodium dichlor per 250 gallons TX - ¼ teaspoon SX - ⅔ teaspoon	Add one (1) tablespoon of monopersulfate (MPS)* per 250 gallons TX - ½ tablespoon SX -1¼ tablespoon
ONCE A WEEK	Add one-half (1/2) teaspoon of sodium dichlor per 250 gallons TX - ¾ teaspoon SX - 1¾ teaspoon	Add one (3) tablespoon of monopersulfate (MPS)* per 250 gallons TX - 1½ tablespoon SX -3¾ tablespoon
EVERY FOUR MONTHS	Drain and refill your spa. Replace the FreshWaterAg+® silver ion purifier. NOTE: Use the Clean Screen™ pre-filter when filling the spa to remove unwanted contaminants.	
AS NEEDED (if water is hazy, cloudy or has an odor)	Add one and one half (1 ½) teaspoons of sodium dichlor per 250-gallons (950 liters). TX - ¾ teaspoon SX - 1¾ teaspoon	

* MPS is an oxidizer, not a sanitizer.

Maintaining the Sanitizer Level

A. Sanitizer is extremely important for killing algae, bacteria and viruses, and preventing unwanted organisms from growing in the spa. At the same time, you don't want too high a sanitizer level, or it can irritate your skin, lungs and eyes.

B. Always maintain the sanitizer level in your spa at the recommended level for each type of sanitizer.

C. Watkins recommends only the following sanitizers:

- Sodium Dichloro-s-Triazinetrione (Sodium Dichlor or Chlorine)
- Brominating Concentrate™ (One Step Granular Bromine)
- BaquaSpa®

⚠ **WARNING:** DO NOT use tri-chlor chlorine, bromo-chloro-dimethyl-hydantoin (BCDMH), any type of compressed bromine or chlorine, acid or any type of sanitizer which is not recommended by Watkins Manufacturing Corporation.

FRESHWATER $_{Ag+}$® SILVER ION SYSTEM

The Silver Ion system is comprised of the following products:

- Clean Screen™ Pre-filter
- Sodium Dichlor
- Monopersulfate (MPS)
- FreshWater $_{Ag+}$ Silver Ion Purifier

Clean Screen™ Pre-filter is used when filling a spa for the first time or at refill. It attaches to a garden hose and filters out rust, dirt, detergents, algae and chemicals.

Sodium Dichlor (chlorine) is the only recommended sanitizer that will work in conjunction with all of the other products in this system.

Monopersulfate (MPS) is an oxidizing chemical used to prevent the buildup of contaminants, maximize sanitizer efficiency, minimize combined chlorine and improve water clarity.

FreshWater$_{Ag+}$ Silver Ion Purifier introduces silver ions into the spa water, inhibiting bacteria growth. When combined with MPS or chlorine, oxidizes particulates in the spa water.

It is important to follow the recommended application and maintenance programs outlined for each product's use.

If the spa is being used over an extended period of time, such as a whole afternoon or evening, additional sanitizer will be needed.

A weekly "shock treatment" is required.

The shock treatment quickly destroys any remaining contaminants while revitalizing the silver ion cartridge, allowing the silver ions to continue to be released into the water. Without this weekly shock treatment, the silver ion cartridge may stop releasing silver ions into the water.

To weekly "shock treat" your spa you may use either MPS or sodium dichlor. It will require much less sodium dichlor to administer the shock treatment than MPS (1 teaspoon of sodium dichlor has oxidizing capabilities comparable to 2 tablespoons of MPS). Sodium dichlor may be a more appropriate weekly shock for those users that experience heavy bather load conditions.

IMPORTANT NOTE: MPS is an oxidizer, not a sanitizer.

EVERFRESH® WATER CARE SYSTEM

The EverFresh water care system is comprised of the FreshWaterAg® + silver ion system and the FreshWater® III high output ozone system.

- FreshWaterAg + silver ion system (see FreshWaterAg + silver ion system on previous page)
- FreshWater® III high output ozone system uses Corona Discharge technology to produce a high concentration of ozone, which is injected into the spa water.

FRESHWATER$_{Ag+}$ SILVER ION PURIFIER REPLACEMENT INSTRUCTIONS

When replacing the Silver Ion Purifer (every four months), it is highly recommended that the spa be drained and refilled at the same time. After refilling the spa with water, balance the Total Alkalinity (TA), Calcium Hardness (CH) and pH to the recommended levels. Shock the spa by adding sodium dichlor.

1. Fold back the cover.
2. Carefully remove and set aside the filter compartment cover.
3. Remove any floating items within the filter compartment.

4. Locate the filter cap. Turn the filter cap counterclockwise until the cap can be removed from the filter standpipe.
5. Remove and clean filter cartridges.
6. Remove the existing FreshWater$_{Ag^+}$® Silver Ion Purifier.
7. Install the new FreshWater$_{Ag^+}$ Silver Ion Purifier into the filter standpipe. Do not force the FreshWater$_{Ag^+}$ Silver Ion Purifier down into the filter standpipe.
8. Reinstall the cleaned filter cartridge.
9. Replace and secure the filter cap.
10. Replace the filter compartment cover.
11. Fold the cover back into place.

⚠ **WARNING:** Never use the spa with the filter cartridge or filter standpipe removed!

Silver Ions Questions and Answers

Question: How are the silver ions actually added to the water?

Answer: The silver ion cartridge contains ceramic beads that are infused with silver. By placing the cartridge in the filter standpipe, it is subjected to the flow of water created by the jet pump's operation. The flowing water, through a chemical erosion process, carries with it the silver ions necessary to add a sanitizing residual to the spa water.

Question: What happens if I do not add the weekly non-chlorine oxidizer treatment?

Answer: The contaminants in the water may coat the silver ion cartridge's ceramic beads, blocking the silver ions' release into the water. When this occurs, there will be no residual of silver ions present in the water, eliminating them from the sanitizing process.

Question: How often should the FreshWater$_{Ag^+}$ Silver ion purifier cartridge be replaced?

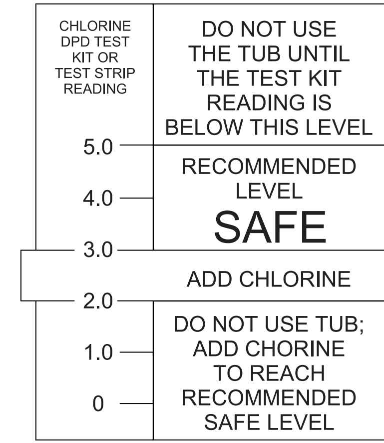
Answer: The cartridge must be replaced every four months. Please refer to the instructions provided with each FreshWater$_{Ag^+}$ silver ion purifier cartridge.

Question: Why can't I use bromine or biguanides instead of MPS or chlorine?

Answer: Bromine and biguanides will chemically react with the sanitizing action of the silver ions. This will eliminate their beneficial sanitizing effect.

Dos and Don'ts

- DO check your MPS or Sodium Dichlor chemical level prior to each use.
- DO change the FreshWater$_{Ag^+}$ silver ion purifier every 4 months.
- DO test Total Alkalinity and pH weekly.
- DO use MPS for spas only, such as Hot Spring® MPS non-chlorine oxidizer.
- DO store all chemicals in a tightly sealed container in a cool, dry place.
- DO check your sanitizer prior to each use.
- DON'T use bromine, sodium bromide or biguanides. These are an active sanitizer and will combine with the silver ions to inactivate them.
- DON'T use a water clarifier. Clarifiers will cause the spa water to become cloudy.



CHLORINE (SODIUM DICHLOR)

A. Sanitizing chemicals, such as chlorine, are oxidants that kill bacteria and viruses in the water. The Free Available Chlorine (FAC) is a measure of the amount of unused chlorine available to sanitize the spa. The recommended FAC for your spa water is 3.0-5.0 ppm.

B. Watkins Manufacturing Corporation recommends the use of Hot Spring FreshWater® Concentrated Chlorinating Granuals (sodium dichlor) for sanitizing the water. Sodium dichlor is preferred because it is totally soluble, dissolves quickly and is nearly pH neutral.

C. Maintaining the proper level of chlorine during use is extremely important.

D. If the FAC is too low, bacteria and viruses can grow rapidly in the warm water. **Increase the FAC by adding granulated Sodium Dichlor.**

E. If the FAC is too high, the water can cause discomfort to the user's eyes, lungs and skin. **Simply allow some time to pass. The FAC level will drop naturally over time.**

F. When the Free Available Chlorine is within the recommended range, the spa is ready to be enjoyed.

⚠ **WARNING:** There are several forms of stabilized chlorine available for use in spas and swimming pools and each form has specific chemical characteristics. It is extremely important that the one you choose is specifically designed for use in spas. Use of an incorrect product such as tri-chlor, which has a very low pH (2.6), dissolves too quickly in hot water resulting in extremely high levels of chlorine, and is designed for concrete or plaster swimming pools, WILL cause damage to your spa. Use of a liquid or

concentrated form of sanitizer WILL damage your spa and is specifically not covered under the terms of the limited warranty.

IMPORTANT: Granulated chlorine (Sodium Dichlor) will degrade if stored improperly. We recommend purchasing chlorine in one or two pound containers and storing it in a cool, dry place to maintain its potency.

Super Chlorination

Super Chlorination is designed to "burn-off" the build-up of chloramines (used chlorine), to eliminate the chlorine smell and to allow the proper level of free chlorine to be maintained.

When giving your water a super chlorination treatment, open the cover at least half way for twenty minutes to allow the chlorine gas to vent off. The high concentration of chlorine gas which may exist as a result of super chlorination (not daily sanitation) may eventually cause discoloration or degradation to the bottom of the cover or the tile grouting, which would not be covered under the terms of your warranty.

IMPORTANT: Always allow the Free Available Chlorine to fall to 5 ppm before using the spa.

⚠ **WARNING:** Never leave an open spa unattended, especially if there are children present!

Building a Sanitizer Routine

During the first month of ownership, measure the sanitizer residual daily in order to establish standards for User Load and Usage Time versus Sanitizer Needed.

- The User Load of the spa is the number of times anyone enters the spa.
- The Usage Time is simply the amount of time a user spends in the spa.
- Sanitizer Needed is the amount of Free Available Chlorine (FAC) needed to accommodate the number of users and their combined usage time.

For example, two spa users who regularly use the spa once an evening for twenty minutes create a specific and somewhat consistent demand on the sanitizer. During the first month of ownership, these two users can determine exactly how much sanitizer to use in order to maintain the proper residual. If, at any time, the user load and/or usage pattern changes dramatically (invited guests), the amount and frequency of sanitizer required increases dramatically.

The greater the usage time or the bather load, the faster the residual value is diminished.

Supplemental Water Maintenance

Proper water sanitation and mineral balance (pH control) are absolutely essential for a complete spa water maintenance program. Here are three other popular water additives that are optional:

Mineral deposit inhibitors

As water evaporates from your spa and new water is added, the amount of dissolved minerals will increase. (Minimize evaporation by keeping the cover on the spa whenever possible.) The spa water may eventually become "hard" (Calcium Hardness too high) enough to damage the heater by calcifying its surface. Proper pH control can minimize this.

Normal soap build-up will require water replacement regularly enough that mineral deposits normally are not a problem.

Occasionally, high iron or copper content in the water may produce green or brown stains on the spa. A mineral deposit inhibitor may help to reduce these metals.

NOTE: Well water may contain high concentrations of minerals. The use of a low water volume, extra-fine pore water filter (in-line pre-filter such as the Clean Screen™ pre-filter) will help to remove many of the larger particles during the filling of the spa. In-line pre-filters can be purchased at your local Solana® Spa Dealer.

Foam inhibitors

Spa water requires changing due to the buildup of soap in the water. Typically, soap will cause the spa water to foam when the jets are used. Soap is introduced into the spa water from two sources: users' bodies, which retain a soap residual after showering, and swimming apparel, which retains soap after washing.

Foam inhibitors can suppress foam, but cannot remove soap from the water. Soap is very difficult to remove from the water because soap is not oxidized by any chemical added to the spa. Only ozone can oxidize soap.

Eventually the soap build-up in the water will be concentrated, resulting in an unclean feeling on the bather's skin which is impossible to remedy. When this occurs, it's time to drain and refill the spa. Depending on the soap input, the water should last about 4 months before needing to be drained.

OZONE (OPTIONAL)

The FreshWater® III high output ozone system is the only ozone purification system Watkins recommends in your Solana spa. The FreshWater III ozone system utilizes Corona Discharge (CD) technology to produce a higher concentration of ozone than is produced by competing ultraviolet light (UV) ozone systems.

The under-the-skirt mounted FreshWater® III high output ozone system unit offers less-visible installation and is less susceptible to the effects of freezing temperatures. To access it for inspection, remove the equipment compartment door to check the unit operation (this is usually done prior to disconnecting the power to the spa before draining). Simply listen for the buzz of the transformer to verify operation of the FreshWater III high output ozone system .

The FreshWater III high output ozone system greatly enhances the quality of the spa water when used to supplement the spa owner's regular water maintenance program. Contrary to some information circulated throughout the pool and spa industry regarding ozone systems, ozone CAN'T be used as a single-source sanitizer, water clarifier, anti-foamer, and mineral chelating agent. A secondary-source sanitizer must be used to maintain 2.0 ppm (2.0 mg/L) of Free Available Chlorine (FAC). Watkins Manufacturing Corporation recommends that a chemical maintenance program based on recognized and documented industry standards still be followed when using an ozone purification system to assure water sanitation and the highest quality purified water.

Cleaning the Ozone Injector

On occasion, a mineral build-up may clog the ozone injector causing a lack of flow or low flow of ozone bubbles. To prevent this, refer to the following instructions to clean the injector:

1. Disconnect power to the spa.
2. Access the equipment compartment.
3. Locate the ozonator in the equipment compartment and unplug the ozonator from the control box.

WARNING

Nitric acid accumulates in the air lines of the ozonator and injector. Nitric acid will cause severe chemical burns if direct skin contact is made, so always wear protective gloves, glasses and clothing when working on the ozonator or injector lines. To prevent inhalation or ingestion of the nitric acid, DO NOT blow or inhale with your mouth to any of the adapters, fittings or tubing of the ozonator or injector air lines.

WARNING

4. Place 16 ounces of white vinegar into a container such as a cup or bucket. Place the container on the equipment compartment floor. NOTE: White vinegar will not damage any of the spa components.

5. Carefully loosen the long Tygon / Kynar tubing to the bottom of the ozonator. **A liquid substance may be found inside the tubing. If a liquid substance is present, be certain not to come into contact with the liquid (see warning above).**
6. Place the end of the tubing into the vinegar, making certain that the end of the tubing sits at the bottom of the container.
7. Reconnect power to the spa.
8. Run the spa until all 16 ounces (half liter) of the vinegar are gone. This should allow an ample flow of vinegar to be run through the injector and clear the blockage.
9. Disconnect power to the spa.
10. Remove the empty cup or bucket.
11. Reinstall the tubing to the bottom of the ozonator.
12. Plug the ozonator into the control box.
13. Close the equipment compartment door.
14. Reconnect power to the spa.

IMPORTANT: When using the FreshWater® III high output ozone system, the circulation cycle must be activated to ensure adequate ozone circulation. Refer to the circulation cycle in the HEATING AND HYDROMASSAGE SYSTEM section for more information.

Dos and Don'ts

- DON'T use swimming pool (muriatic) acid to lower pH.
- DON'T splash pH increaser additives on the siding.
- DON'T use Compressed Sanitizers.

The use of bromine sticks or tablets in floaters, which may become entrapped in a lounge or cooling seat (or sink to the spa floor), have been shown to cause discoloration of or surface distress to a spa's shell.

- DON'T use a floater type sanitization system as a low or no maintenance solution to your spa maintenance program.

The spa shell easily can withstand the effects of a properly administered sanitizer. Floating dispensers can become trapped in one area and cause an over-sanitization (or chemical burn) of that particular area.

If the dispenser setting is too high, the high concentration can discolor the spa shell and damage the underside of the cover.

Automatic floating dispensers have a tendency to either over-brominate or under-brominate as the rate of erosion varies greatly. Damage to the spa and cover can occur very quickly.

⚠ **WARNING:** Watkins Manufacturing Corporation DOES NOT recommend the use of any floating chemical dispenser. Damage to the spa shell or components caused by a floating chemical dispenser is specifically not covered under the terms of the limited warranty.

- DON'T use a sanitizer which is not designed for spas.
- DON'T use Household Bleach (liquid sodium hypochlorite).
- DON'T broadcast or sprinkle the chemicals onto the water surface. This method may cause chemically-induced spa surface blistering (chemical abuse).
- DO add all chemicals slowly into the filter compartment with the jet pump operating on high speed for ten minutes.
- DO use special care if using baking soda to clean either the interior or exterior plastic surfaces.
- DO use only a granular form of sanitizer (chlorine or MPS).

COMMON WATER CHEMISTRY QUESTIONS

Question: Why can't I use a floater to sanitize my spa water?

Answer: Watkins does not recommend the use of a floater for three reasons.

1. The floater is unable to control the rate at which sanitizer is dissolved into the water. When a floater is first placed in a spa, the sanitizer level can be extremely high. High sanitizer levels can chemically burn or discolor the spa's shell or the underside of the cover. Then, after a period of time, the sanitizer level dispensed by the floater will fall to near zero. A low sanitizer level will allow viruses, bacteria or algae to grow.
2. Floaters tend to stay in one area of the spa most of the time (usually over the cool down seat), causing this area to be exposed to extreme sanitizer levels.
3. The floater may allow pieces of the highly concentrated sanitizer to fall out and settle on the floor or seat of the spa shell. These pieces of sanitizer will chemically burn (blister) the spa shell. Although your spa shell is specifically designed to resist the effects of spa chemicals, no spa surface can withstand this type of highly concentrated chemical. Remember, chemical abuse is specifically not covered under the terms of the warranty.

Question: When I open my spa, I smell chlorine. How do I get rid of this smell?

Answer: There are two types of chlorine in your spa. The first is the Free Available Chlorine, which is the chlorine available to sanitize your spa. This available free chlorine does not have an odor. The second is Chloramine, which is residue from chlorine already expended. Chloramines have a strong chlorine odor. The smell from Chloramines can be eliminated by "shocking" the water. If you smell chlorine in the water, your spa is reminding you to add a shock treatment.

Question: Why can't I fill my spa with soft water?

Answer: Soft water is essentially the same as regular water except that most or all of the calcium has been replaced by sodium. Soft water may be corrosive to the heater and other components. Replacement of spa components damaged by soft water is extremely expensive.

Question: I am trying to reduce the number of chemicals to which my family is exposed. Do I really need to use so many chemicals and in such large amounts?

Answer: While over-exposure to any chemical can be unhealthful, many low levels of chemicals are effective and beneficial. In the case of spa water, the chemicals recommended in the Solana® Spa Water Maintenance program are needed to protect the user from water-borne pathogens (disease-causing microbes) and to prevent corrosion of spa components.

Question: Why isn't water chemistry damage covered by the warranty?

Answer: The chemical levels and water quality of the water in the spa are under your direct control. With proper basic care, the spa will provide many years of hot water relaxation. If you are unsure about any chemical or its usage in the spa, contact your Authorized Dealer or Watkins Manufacturing.

WATER TERMINOLOGY

The following chemical terms are used in this Water Quality and Maintenance section. Understanding their meaning will help you to better understand the water maintenance process.

Bromamines: Compounds formed when bromine combines with nitrogen from body oils, urine, perspiration, etc. Unlike chloramines, bromamines have no pungent odor and are effective sanitizers.

Bromine: A halogen sanitizer (in the same chemical family as chlorine). Bromine is commonly used in stick, tablet, or granular form. See the DOs and DON'Ts of Spa Water Maintenance for additional information.

Calcium Hardness: The amount of dissolved calcium in the spa water. This should be approximately 100-150 ppm. High levels of calcium can cause cloudy water and scaling. Low levels can cause harm to the spa equipment.

Chloramines: Compounds formed when chlorine combines with nitrogen from body oils, urine, perspiration, etc. Chloramines can cause eye irritation as well as having a strong odor. Unlike bromamines, chloramines are weaker, slower sanitizers.

Chlorine: An efficient sanitizing chemical for spas. Watkins Manufacturing Corporation recommends the use of Sodium Dichlor-type granulated chlorine. This type is preferred because it is totally soluble and nearly pH neutral.

Chlorine (or Bromine) Residual: The amount of chlorine or bromine remaining after chlorine or bromine demand has been satisfied. The residual is, therefore, the amount of sanitizer which is chemically available to kill bacteria, viruses and algae.

Corrosion: The gradual wearing away of metal spa parts, usually caused by chemical action. Generally, corrosion is caused by low pH or by water with levels of TA, CH, pH or sanitizer which are outside the recommended ranges.

DPD: The preferred reagent used in test kits to measure the Free Available Chlorine.

Halogen: Any one of these five elements: fluorine, chlorine, bromine, iodine and astatine.

MPS: Monopersulfate is the non-chlorine oxidizer used with the FreshWater$_{Ag^+}$® Silver Ion Purification system.

Oxidizer: The use of an oxidizing chemical is to prevent the buildup of contaminants, maximize sanitizer efficiency, minimize combined chlorine and improve water clarity.

Pathogen: A microorganism such as bacterium that cause disease.

pH: The measure of the spa water's acidity and alkalinity. The recommended pH for the spa water is 7.4 to 7.6. Below 7.0 (considered neutral), the spa water is too acidic and can damage the heating system. Above 7.8, the water is too alkaline and can result in cloudy water and scale formation on the shell and heater.

ppm: The abbreviation of "parts per million", the standard measurement of chemical concentration in water. Identical to mg/l (milligrams per liter).

Reagent: A chemical material in liquid, powder or tablet form for use in chemical testing.

Sanitizer: Sanitizers are added and maintained at recommended residuals to protect bathers against pathogenic organisms which can cause disease and infection in spa water.

Scale: Rough calcium-bearing deposits that can coat spa surfaces, heaters, plumbing lines and clog filters. Generally, scaling is caused by mineral content combined with high pH. Additionally, scale forms more readily at higher water temperatures.

Shock Treatment: Also known as "super-chlorination" when chorine is used. Shock treatment is a process of adding significant doses of a quick dissolving sanitizer (MPS or sodium dichlor is recommended) to oxidize non-filterable organic waste and to remove chloramines and bromamines.

Total Alkalinity: The amount of bicarbonates, carbonates, and hydroxides present in spa water. Proper total alkalinity is important for

pH control. If the TA is too high, the pH is difficult to adjust. If the TA is too low, the pH will be difficult to hold at the proper level. The desired range of TA in spa water is 40 to 120 ppm.

VI. SERVICE INFORMATION

Your Solana® Spa has been designed to provide years of trouble-free use. As with any appliance, problems may occasionally occur that require the expertise of a qualified service person. Though such simple repairs as resetting a GFCI switch or breaker, High Limit Thermostat, or Pressure Switch or replacing a light bulb may not require a service call, they may indicate that a more serious condition exists. These conditions may require an experienced service person. Before calling for service, please refer to the Troubleshooting Guide.

NOTE: Always retain your original sales receipt for future reference.

GFCI AND HIGH-LIMIT THERMOSTAT

If your spa fails to operate at any time, the following items should be checked:

1. Check the power supply to the spa.
2. Check the GFCI (located at the end of the cord in standard models or in the electrical sub-panel in 30 or 50 amp converted models) and see if it has tripped. If a GFCI has tripped, reset it. If it will not reset, this may be an indication of a ground fault (short circuit) within the electrical components. Contact an Authorized Service Technician for a complete diagnosis.
3. If upon checking the GFCI you find it has not tripped, check the house breaker panel and ensure the main breaker for the electrical circuit supplying the spa has not tripped. If it has, this is an indication that either the circuit was overloaded or a ground fault exists between the breaker panel and the spa receptacle. Contact a qualified electrician.
4. If, upon checking the main house breaker, you find no failures, the heater high-limit thermostat should be checked. Tripping of the heater hight-limit thermostat is normally a result of one or a combination of any of these problems: 10 blockage within the system plumbing, 2) switch malfunction in the heater circuit, or 3) the low speed mode of the jet pump is not functioning.
5. If the heater high-limit has tripped, the control panel will read ----. Reset the heater high-limit by allowing the water to cool and disconnecting power to the spa for at least thirty seconds. If the heater hight-limit continues to trip, contact an Authorized Service Technician for a complete diagnosis.

FRESHWATER® III HIGH OUTPUT OZONE SYSTEM (OPTIONAL)

The FreshWater III high output ozone system is practically maintenance-free because it is located within the spa's equipment compartment. If bubbles are appearing at the spa's heater return (also functions as the floor drain) but the smell of ozone is not noticeable (the water may also appear not as clear as usual), then the operation of the ozone generator should be checked. Carefully open the equipment compartment door (remember to use care, as power is still connected to the spa) and verify that the CD tube and its transformer are energized (a slight buzz will be emitted from the ozone generator housing). If a slight buzz or hum is not audible, verify that the generator is completely plugged into the spa's control box.

If the unit is plugged in and power is connected to the spa, then the fuse (for the ozone generator) should be checked.

⚠ **WARNING:** Contact your Solana® Spa Dealer if your spa requires troubleshooting beyond the scope of this manual. Freshwater III high output ozone systems should only be serviced by a qualified technician.

WARRANTY NOTE: Cleaning of the ozone injector is not covered under the warranty. Refer to the Ozone section of this manual for ozone injector cleaning instructions.

The FreshWater III ozone system WILL ONLY operate when the low speed of the jet pump is on.

- During the low speed cycle, you will see bubbles escaping from the heater return, these bubbles come directly from the operating ozone unit.
- The Filter Cycle must be activated in order to ensure adequate ozone circulation time. The filter cycle (when activated) will turn the jet pump on low speed for the programmed time. See FILTER CYCLE in the OPERATING INSTRUCTIONS section of the Owner's Manual for more information.

The FreshWater III high output ozonator WILL NOT operate when the high speed of the jet pump is on.

- During the high speed cycle, you will also see bubbles escaping from the floor drain, however, the ozone unit is off and the bubbles that are visible are air bubbles only!
- The Filter Cycle must be activated in order to ensure adiquate ozone circulation time. The filter cycle (when activated) will turn the jet pump on low speed for the programmed time. See FILTER CYCLE in the OPERATING INSTRUCTIONS section of the Owner's Manual for more information.

The FreshWater III high output ozonator WILL NOT operate when the high speed of the jet pump is on.

- During the high speed cycle, you will also see bubbles escaping from the floor drain, however, the ozone unit is off and the bubbles that are visible are air bubbles only!

MISCELLANEOUS SERVICE INFORMATION

The jet pump is equipped with a overload cut-off switch, which is designed to protect the pump from overheating. If the pump shuts itself off in a new spa, it is usually the result of one, or a combination of, the following factors:

High Temperature: During the summer months, especially in warmer climates, the ambient temperature contributes to excessively high temperatures within the equipment compartment.

Friction: Sometimes the moving parts of a new pump are tight enough to cause heat build-up due to friction. After a normal break-in period, the pump will run cooler.

Improper House Wiring: If the spa is not connected to a dedicated circuit, or is connected to an extension cord, or the house wiring is undersized, the pump may starve for voltage and therefore may draw more amperage and generate excessive heat. This will often cause the circuit breaker to trip repeatedly.

IMPORTANT:

1. If the pump is shutting down due to excessive heat, make sure the equipment compartment has adequate ventilation. The air gap at the bottom and the jet pump vent at the bottom left corner must not be blocked. Should your jet pump continue to shut off after short periods of use, contact a qualified service technician.
2. The Solana® Spa is equipped with a safety suction spring valve which will break the prime of the jet pump if both suction fittings are obstructed.

ACTS INVALIDATING WARRANTY

The limited warranty is void if the Solana Spa has been subjected to alteration, misuse or abuse, or if any repairs on the spa are attempted by anyone other than an authorized representative of Watkins Manufacturing Corporation. Alteration is defined as any component or plumbing change, electrical conversion, or the addition of any non-approved sanitation or water purification device or heating system which contributes to a component failure, unit failure or unsafe operating condition. Misuse and abuse shall include any operation of the spa other than in accordance with Watkins Manufacturing Corporation printed instructions, or use of the spa in an application for which it is not designed; specifically: use of the spa in a non-residential application; damage caused by operation* of the spa at water temperatures outside the range of 35°F and 120 °F (1° C and 49° C); damage caused by a dirty, clogged or calcified filter cartridge; damage to the spa surface caused by the use of Tri-Chloro Chlorine, BCDMH, chemical tablets in a floater, acid, or any other spa chemicals or spa surface cleaners which are not recommended by Watkins Manufacturing Corporation; damage caused

by allowing undissolved spa sanitizing chemicals to lie on the spa surface (no spa surface material can withstand this kind of abuse); damage to components or spa surface caused by improper water chemistry maintenance; and damage to the spa surface caused by leaving the spa uncovered while empty of water and in direct exposure to sunlight (this may cause solar heating distress in warm weather regions). These are considered abuses and may invalidate this warranty.

*Operation of the spa does not mean "use" of the spa! Watkins Manufacturing Corporation does not recommend using the spa if the water temperature is above or below the spa's control panel temperature range.

DISCLAIMERS

Watkins Manufacturing Corporation shall not be liable for loss of use of the Solana® Spa or other incidental or consequential costs, expenses or damages, which may include but are not limited to, the removal of a permanent deck or other custom fixture. Any implied warranty shall have a duration equal to the duration of the applicable warranty stated above. Under no circumstances shall Watkins Manufacturing Corporation or any of its representatives be held liable for injury to any person or damage to any property, however arising.

WATKINS CUSTOMER SERVICE

If you have any questions about any aspect of your Solana Spa set-up, operation or maintenance that have not been answered by this manual, consult your Solana Spa Dealer.

Watkins Manufacturing Corporation can be reached at: 800-999-4688 (Extension 8432), Monday through Friday, 8 am to 5-pm Pacific Standard Time (PST), or e-mail at Custsvc@watkinsmfg.com.

TROUBLESHOOTING

Watkins Manufacturing Corporation strives to provide the most trouble-free spas on the market. Should you experience any problem whatsoever, do not hesitate to contact your authorized Solana Spa Dealer. Here are some tips to help you to diagnose and rectify some more common sources of trouble yourself, if you choose to do so.

GENERAL OPERATION TROUBLESHOOTING GUIDE

PROBLEM	PROBABLE CAUSES	SOLUTIONS
Entire spa is inoperative	• Power failure / not plugged in • GFCI tripped • Heater high-limit thermostat trippe	• Check power source • Reset GFCI; call for service if it will not reset • Disconnect power for at least thirty seconds to reset heater high limit. If it will not reset, check for clogged filters. If tripping continues, call for service.
Spa jets and heat off, light operates (Display reads -:-:-:-)	• Pressure switch is open when jets are on and should be closed.	• Check for clogged filter. The pressure switch will reset when the flow of water through the heater has been restored. Call for service if the pressure switch trips frequently
(Display reads ----)	Pressure switch senses flow through heater even though the jet pump is off	Contact an Authorized Service Technician
READY icon flashes	• Control Sensor open or shorted	• Contact an Authorized Service Technician
Jets weak or surging	• Spa water level too low • Filters clogged / Jet intake screens clogged • Jet nozzles closed / Air valve closed	• Add water • Clean filters / Clean jet intake screens • Open jet nozzles / Open air valve
Light inoperative	• Spa lock activated • Light wiring or assembly is faulty	• Deactivate spa lock • Replace light assembly.
Display reads - - - - (Entire spa inoperative)	• Heater high-limit thermostat tripped	• Disconnect power to the spa for at least thirty seconds to reset the heater high-limit. If tripping continues, clean the filter, then if tripping still occurs, call for service..
Set water temperature significantly different from display temperature	• System Controls	• Contact an Authorized Service Technician

(continued on next page)

SPA WATER MAINTENANCE TROUBLESHOOTING GUIDE

Problem	Probable causes	Solutions
Cloudy Water	• Dirty filters • Excessive oils / organic matter • Improper sanitization • Suspended particles / organic matter • Overused or old water	• Clean filters • Shock spa with sanitizer • Add sanitizer • Adjust pH and/or alkalinity to recommended range • Run jet pump(s) and clean filters • Drain and refill the spa
Water Odor	• Excessive organics in water • Improper sanitization • Low pH	• Shock spa with sanitizer • Add sanitizer • Adjust pH to recommended range
Chlorine Odor	• Chloramine level too high • Low pH	• Shock spa with sanitizer • Adjust pH to recommended range
Musty Odor	• Bacteria or algae growth	• Shock spa with sanitizer – if problem is visible or persistent, drain, clean and refill the spa
Organic buildup / scum ring around spa	• Buildup of oils and dirt	• Wipe off scum with clean rag – if severe, drain the spa, use a spa surface and tile cleaner to remove the scum and refill the spa
Algae Growth	• High pH • Low sanitizer level	• Shock spa with sanitizer and adjust pH • Shock spa with sanitizer and maintain sanitizer level
Eye Irritation	• Low pH • Low sanitizer level	• Adjust pH • Shock spa with sanitizer and maintain sanitizer level
Skin Irritation / Rash	• Unsanitary water • Free chlorine level above 5 ppm	• Shock spa with sanitizer and maintain sanitizer level • Allow free chlorine level to drop below 5 ppm before spa use
Stains	• Total alkalinity and/or pH too low • High iron or copper in source water	• Adjust total alkalinity and/or pH • Use a metal deposit inhibitor
Scale	• High calcium content in water – total alkalinity and pH too high	• Adjust total alkalinity and pH – if scale requires removal, drain the spa, scrub off the scale, refill the spa and balance the water

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The Home Relaxation Specialists

WATKINS MANUFACTURING CORPORATION
VISTA, CALIFORNIA
USA

This manual contains installation, operating, maintenance and service information for the following 2010 Solana® spa models, effective January, 2010.

USA MODEL	CANADIAN MODEL
TX (Model X)	TX (Model XC)
SX (Model Y)	SX (Model YC)

SOLANA®

Serenity made simple®

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